

Tao Systems have developed their own high-speed raytracing system, shown above rendering their logo. This will eventually be used to speed up Autodesk's *3D Studio* – a copy of which can be won on page 60







Obsolescence… Could it soon be a thing of the past?

This month **Edge** got a glimpse of the future, thanks to a demonstration of the *Taos* operating system. Full details can be found on page 10, but in a nutshell *Taos* enables programs coded on any machine to run on any other machine – in parallel, across any available processors in the system.

And because of the way *Taos* programs are structured, the system could open the way to a computer that can be upgraded simply by plugging in extra processors; *Taos* recognises the new chips and allocates components of the code accordingly.

So, for instance, instead of buying a new game, you could spend your money on an upgrade pack to speed up the games you already have. With the beneficial side effect that your console is safeguarded against obsolescence.

This ingenious software could have huge ramifications for the entire computer and videogame industry – *if* it becomes an accepted operating system. But given that Tao Systems – the company behind it – are already talking to some major Japanese corporations and have close links with Inmos in Bristol, this is a real possibility.

Taos is even more amazing when you realise that it is the product of one man's efforts, coding for his own benefit, rather than the cumulative efforts of some corporate programming team.

In that respect, *Taos* is an echo of the pioneering days of computer games, when lone programmers working at home managed to create astonishingly compact and efficient code.

And with a programming tool like *Taos* at their disposal, those groundbreaking programmers could have their day once more…

The **future** is almost here…

inside EDGE issue nine

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Colour reproduction
Electronic Scanning, Bristol
Saturn Repro, Bath

Print
Cradley Print,
Warley, West Midlands
Edge is printed on Royal Press 90 gsm

Typography (Adobe®)
ITC Franklin Gothic/**Heavy**
Gill Sans/**Bold**
Bell Gothic Light/**Black**



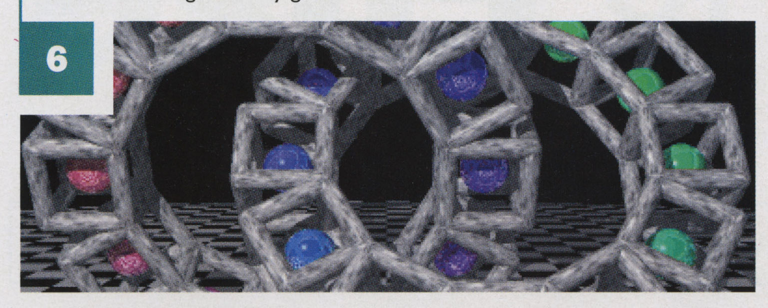


insideview

News

Hot stories this issue include the first pictures of Saturn, shots of Sony's PS-X software and our cover story: *Taos* is a new operating system that could well change the way games – and consoles – are made

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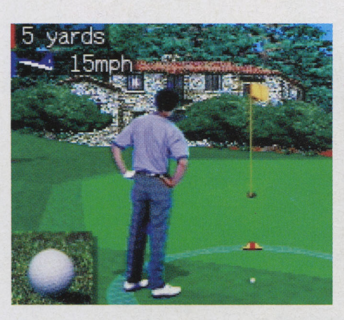
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Prescreen

Edge's forthcoming attractions include PC *Theme Park* (left) and *Flink* on Mega Drive (right), plus games on Jaguar and LaserActive





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Testscreen

Once again **Edge** skims the cream from the top of the gaming world, including new 3DO titles *Pebble Beach Golf* (left) and *The Horde* (right)



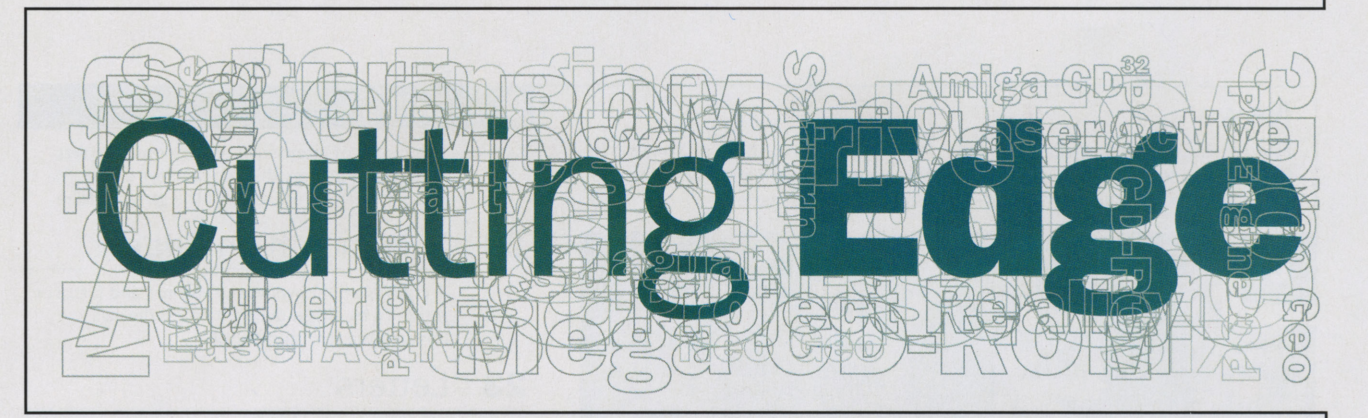
Photography: Jude Edgington

Jon Hare

Sensible Software have grown from a two-man, one-format company into a programming team with games on almost every machine. 'Orchestrating Director' Jon Hare talks to **Edge** about hardware and the evils of incompatibility

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Sega Saturn makes its debut, **page 6**... First screenshots of **PS-X** games, **page 8**... **TAOS:** the operating system that could change everything, **page 10**... **ECTS:** show report, **page 14**... **CSG:** show report, page 16... New **Acorn** PC-compatible machine, **page 18**



The very latest **news** from across the entire world of videogaming

Saturn shows its true **colours**

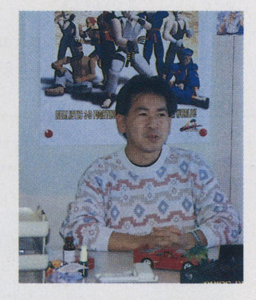
Despite rumours that Saturn is outclassed by the PS-X, Sega are forging ahead; the Japanese press recently got their first look at the machine



Hugely desirable kit: in true Japanese style, Sega paid great attention to the design of Saturn, resulting in unrivalled must-have appeal. Atari and Commodore take note...



***Daytona USA*, as it will be known over here. But will Saturn be powerful enough to do it justice?**



Hiroshi 'Yu' Suzuki talks freely about his work on *Virtua Fighters* for the Saturn

After months of carefully timed mumblings and prudent rationing of game screenshots, Sega Enterprises have finally got around to showing a mock-up of their Saturn console to the fervent Japanese games press. Pictures of the console were distributed to Japanese magazines, while at the same time a Japanese television channel was permitted to give its viewers an early glimpse of the system, as well as one of its games.

The design of the unit comes as a surprise to those expecting the system to be purely CD-based – at the rear of the machine a cartridge slot is clearly visible. However, Sega are adamant that this is a prototype model (made out of wood, incidentally), and by no means the finished unit; changes, whether big or small, could still be →

Virtua Fighters: in development

Sega's coin-op maestro, Yu Suzuki, is also the producer of *Virtua Fighters* for Saturn. This is what he had to say about the game in the Saturn press brochure distributed at the CSG show in Tokyo.

The life of the game, above all the movements and skills of the characters, are all going →

SATURN

Sega's CSG show flyer not only sported the new Saturn logo but included familiar Edge shots of forthcoming Saturn games



Saturn's switchgear (left to right): power on/off, CD lid release and reset button

← to be included. We have plans to make a complete adaptation of all the movements and skills. On the other hand, there will be a reduction in the number of polygons compared to the coin-op.

There are about 700 motions in the arcade version and we make up the actions of the characters from this. There is in effect an infinite variation. We hope to reproduce all of these.

All the characters are the same. Each of the eight individuals has fans and we take this very seriously. We hope to faithfully reproduce the movement of their feet, knees, hands, arms.

In the arcade versions there are the limits imposed by time and profitability. At home you can play for as long as you want. As a software writer, that means a different kind of enjoyment and I am very happy to be involved with both versions.

← made, and even the 'Saturn' product name is still, in Sega's words, 'provisional'. Whatever the case, in opting for the classy champagne-grey finish found on some top-end VCRs and camcorders, Sega have ensured that Saturn has the makings of a classic piece of hardware design.

The Sega PR division responsible for Saturn played only a minor role at the recent CSG show in Ikebukuro (see page 16). Saturn was low on the Sega agenda, but nevertheless, to keep the general enthusiasm in check, the company distributed a brochure which gave details of the first wave of titles for the platform and contained comments by AM2's Yu Suzuki about the Saturn conversion of *Virtua Fighters* (see translation opposite). The other Saturn games listed inside the brochure were *Daytona GP* and the three unnamed original titles seen in **Edge** 6,7 and 8.

Further Japanese interest in Saturn was generated by a recent Japanese television programme devoted to Sega. 'Special New' (TBS Channel 6) showed Sega's president, Mr Nakayama, at his recent 61st birthday party, held at the AOU. Nakayama's visit to the Las Vegas CES in January was also closely monitored by the media, before attention switched to Japan, where TV journalists were given access to Sega's consumer (console) R&D labs. Here, Nakayama unwrapped the wooden mock-up of Saturn while a commentator talked about Sega's more general plans for the future. This sneak preview of the system culminated in a demonstration of a working version of *Virtua Fighters*.

Despite the excitement about Saturn, Sega must be concerned by Sony's plans to launch their own machine at around the same time, now that PS-X is causing a stir in the higher reaches of the Japanese games community. Both companies have prestigious thirdparty developers like Capcom, Konami and Namco on their team, but the consensus is that Sony still have a considerable edge with their technology. Saturn might include three custom Hitachi-designed processors in an effort to catch up, but many pundits are nevertheless convinced that Sega will delay their system to prevent being usurped in the hardware hierarchy.

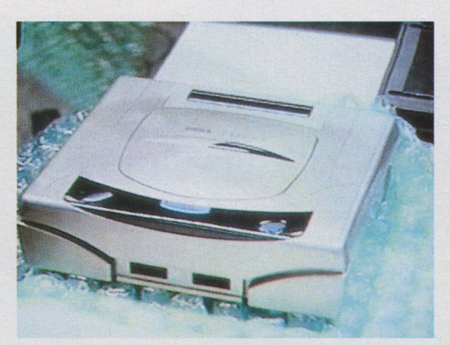
However, Sega are still claiming that Saturn's official launchpad will be the Tokyo Toy Show this June. One ticket to Tokyo, please... E

What is it?

It claims to be the world's fastest VR system. It is able to render five million Gouraud-shaded triangles/second and four million phong-shaded triangles/second with spectacular lighting and photo-texturing

Sony's plans to launch at the same time must be a major concern for Sega, now that PS-X is causing a stir







Japanese viewers of the Special New programme recently caught their first glimpse of Saturn. Sega president Hayao Nakayama showed the prototype unit (left), before its sleek design was revealed in close-up (middle), followed by an indication of what the machine was capable of (right)

Sony PS-X gets first screening

Sony show the Japanese public what their system is capable of

it is...
Division's Pixel Planes 6 virtual reality system, a high-performance image generation system developed by the University Of North Carolina. An entry-level system will cost the VR fan a mere $200,000

After a long period of reticence, Sony have finally revealed an initial brief for the European and US launch of their breathtakingly potent PS-X games system. The console, which is on schedule to hit Japanese homes in November this year, won't be making an appearance in Europe or the US until 1995 – probably September.

Delaying the launch of the machine in Europe and the US could be a wise move on Sony's part. As 3DO, Jaguar and perhaps even the Mega Drive 32 try to force their way into the UK games market over the next 12 months, Sony have a 15-month development window which they can use to help their line-up of top thirdparty developers to compile a library of at least 20 quality software titles which will be available at launch in Europe and the US.

Of course, when the machine is launched in Japan this autumn it will have to survive without this software back-up, although five titles per month have been promised. Sony remain unconcerned: 'I don't think this is a numbers game,' claims **Akira Sato**, director of Sony Computer Entertainment in Japan. 'Rather than providing a huge choice, we have to make the kind of impact that convinces the consumer that software that exploits PS-X really is something special. If it's not realtime, it's not a game.' Hardware has a tradition of debuting in Japan without a proper →



An image from the PS-X game *Legend* – part of a Japanese TV demo illustrating the incredible realtime polygon power of Sony's machine



Turning the platform game on its head – literally – this PS-X demo showed how such a game could work with 3D polygons

Attract mode

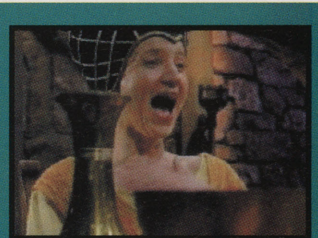
Once again, Edge takes time out to enjoy one of the better game intros around. This month, Crystal Dynamics' medieval hack 'n' slash game on the 3DO, *The Horde*, has the distinction of being chosen for Attract Mode. (Check out Testscreen on page 70.)



1 **The hero of the game, Chauncey, a servant in the royal household, enters the great hall where the King is holding a banquet. Laughter fills the air as he begins his duties**



2 **Whilst Chauncey waits on the tables, the evil High Chancellor tells the assembled guests about a land far away, where hordes of monsters eat the local villagers**



3 **The Chancellor's horrifying story does little to worry the guests, who by this time are quite merry. In fact, they find the tale very amusing and begin to roar with laughter**





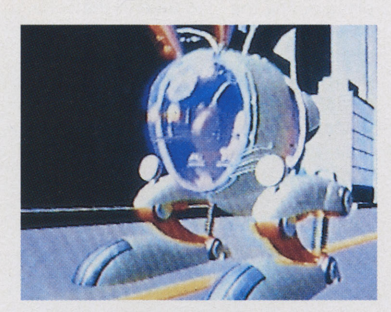
Telebi Asahi's popular late night TV show, Tonight, on Channel 10, gave Japanese viewers an early glimpse of the Sony PS-X in action, with a stunning trip through the textured passages of a dungeon in *Legend*. The broadcast's midnight timeslot prevented younger players from getting too excited

'We have to convince the consumer that software that exploits PS-X really is something special. If it's not realtime it's not a game'

Akira Sato, director of Sony Computer Entertainment, Japan

← catalogue of software. The end of 1990, when Nintendo sold over a million Super Famicoms, despite there being just two (admittedly great) titles available for it, must surely be a comforting memory for Sony.

Japanese TV viewers recently got a taste of PS-X performance on Telebi Asashi's midnight Channel 10 show, Tonight, which usually concentrates on topics such as hot new Tokyo nightspots rather than cutting-edge games hardware. But with the Japanese games industry on the brink of its fiercest rivalry to date, the media spotlight on the games market has intensified by several megawatts; Tonight featured not only PS-X demos but also NEC's FX in action.



The poor quality of this TV image belies PS-X's potent rendering power. 60fps is no problem for the system

Legend was one of the PS-X demos which appeared on the show. Featuring some astonishing realtime polygons, the TV demo took a path down a highly detailed and textured dungeon before coming face to face with an enormous animated dragon. The execution of this realtime demo was incredible.

As detailed in **Edge** 5 and 6, PS-X can manipulate incredibly complex texture-mapped polygons in realtime at 60fps – just like Namco's *Ridge Racer* and Sega's *Daytona USA* coin-ops – besides offering unprecedented 2D sprite power. (Indeed, the interview with Namco in last month's **Edge** revealed that PS-X *Ridge Racer* will be *identical* to the arcade version.)

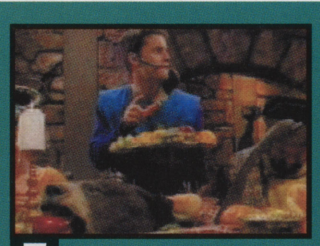
With Capcom, Konami, Namco and, of course, Sony and Psygnosis spearheading the development of PS-X software, the future for Sony's console looks formidable. The latest rumour is that November's launch will see the PS-X launched at a fiercely competitive ¥30,000 (£200). The official name of the system (Sony GameMan, perhaps?) will be announced shortly. Importers, take your positions...

Nintendo ignored?

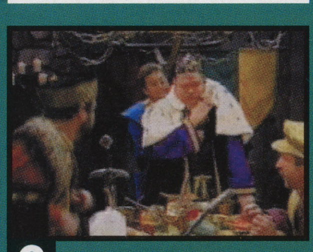
Nintendo, the company with a 90% share of the videogames industry in Japan, have been relegated to the sidelines in the current hardware race, and it's Saturn and PS-X that are grabbing all the headlines. With Project Reality still some way off, loyal Nintendo licensees like Capcom and Konami are placing Sony's PS-X and (to a lesser extent) Sega's Saturn clearly ahead in the race to the next level. Could Sony oust Nintendo from their long-term domination of the industry? Some industry pundits seem to think it's going to happen.



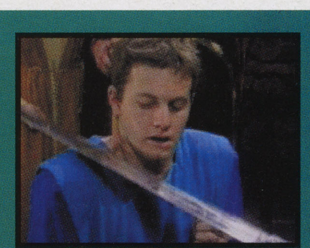
4 The King laughs so hard that he starts to choke on a piece of food, clutching his throat as he fights for breath. But no-one, it seems, has noticed his struggle



5 The guests carry on laughing and the Chancellor continues to tell his story. Chauncey is the only person to notice that the King is actually fighting for his life



6 Chauncey valiantly leaps to the King's aid. But Chauncey's sudden movements alert the Chancellor, who thinks that the servant is actually attacking the King



7 Chauncey dislodges the food from the King's throat. The King is so grateful he knights Chauncey and hands over his mighty sword, 'Grimthwacker'. Game on...

Taos: setting new standards

Edge examines a new operating system that could change the world


Photographs: Jim Reitman

Three wise men: (from left to right) Chris Hinsley (inventor of *Taos*), Tim Moore and Francis Charig – the directors of Tao Systems

The constant evolution of videogames hardware has meant that systems have been dogged by the perennial problems of disparate architectures, splintered markets, obsolescence and lack of portability. But all that could change with the advent of *Taos* (pronounced *dow-os*) – a global, heterogeneous, parallel-processing operating system with no speed overheads and a minuscule kernel size.

Taos is the brainchild of **Chris Hinsley** – programmer of such classics as *Pyjamarama*, *Everyone's A Wally*, *Frostbyte* and *Onslaught*.

'I started in the days when the ZX81 came out, and moved up through most of the machines that have come along since then,' says Chris. 'When the move to 16bit machines came around, it became obvious that the porting times from one architecture to another was becoming prohibitive – it was taking more and more time doing something that you'd already written once, and you then had to write it all again for another machine.'

Chris had the idea of producing an operating system that would manage games and also aid code portability. The first step was a macro set which Chris constructed for the assemblers of all the platformers he was writing on. Rather than write in the native assembler language, he wrote in the macro language he'd defined; he then devised a translator which would take a binary equivalent of that macro set and translate it, on the fly, into the instructions for a particular machine.

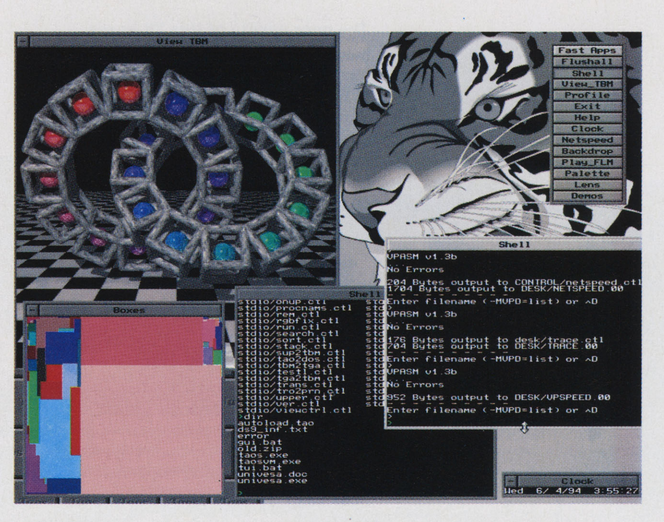
'This 'virtual processor' works like a 16bit-register RISC microprocessor,' explains Chris. 'But it isn't an emulated technology; it actually translates into native code and it's the native code which runs and all the translations take place during the load time of the code.'

When developing the system, Chris realised that standard libraries would be needed – particularly on the GUI (Graphical User Interface) side, such as window managers, graphic drawing tools, polygon generators, MPEG video and so on. It was then that he drew on the talents of **Tim Moore**.

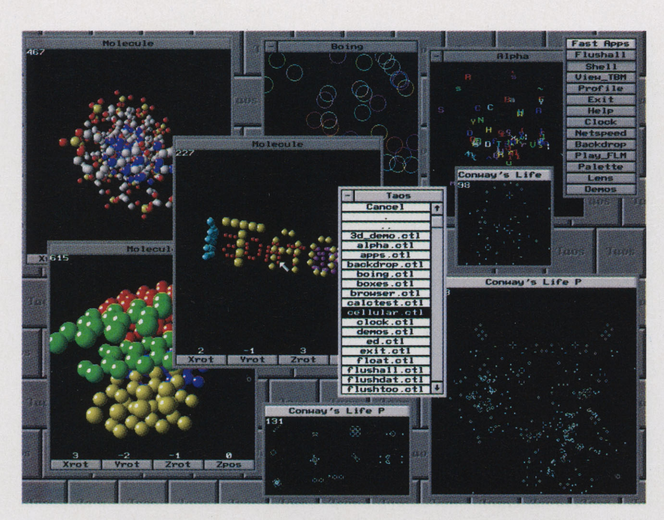
The two first met when Chris was working for Microgen and Tim was doing Amstrad conversions for Digital →

By definition

Tao: that in virtue of which all things happen or exist; the rational basis of human conduct; the course of life and its relation to eternal truth. [Chinese, literally: path, way]



***Taos* comes with its own graphical interface which boasts fully sizeable windows and is easy to use. Unlike some windows programs...**



***Taos*' versatility is shown in its ability to multitask a number of programs in parallel – and even the same program with different tasks**

Taos features

Hardware independence: *Taos* applications run on different processor architectures without having to recompile or reconfigure the code.
Load balancing: an optimum distribution of processes over the processor network.
Heterogeneous processing: Parallel applications are able to operate over networks of dissimilar processors.
Dynamic binding: Only those parts of an application which are needed at any time are loaded into memory.
Multi-threading: A piece of code loaded into memory is available to all programs that need it.
Parallelism: *Taos* uses a process-based programming model, allowing parallel programs to be written more easily.
Minimal kernel: *Taos*' basic code is very compact – about 10K. This optimises performance and minimises memory requirements.

← Integration. Their first product together was the Atari ST version of *Verminator* for Rainbird – at which point Telecomsoft hit financial difficulties and was bought out by Microprose.

'Tim was working on a raytracer for the Amiga and he'd done some work on the ST,' recalls Chris, 'and that's when we had the idea of doing a parallel system – the idea of being able to plug in more processors to make the system run faster. At first it was simply a desire to speed up Tim's tracer.'

At this time – the mid-'80s – transputers were all the rage. The guiding concept behind transputers was that they could run in parallel: the more chips you plugged into a board, the faster your application ran.

Tim initially set about attempting to generate workstation performance on a PC. 'We had the idea of adding T800 transputers to improve the performance of that system,' states Tim. 'I don't think we'd considered doing different microprocessor architectures on the same system, but because we had this binary portability, it meant it wasn't as difficult as other people were finding.'

Chris agrees: 'I coded up a small kernel for the transputer system and that was ported from the 68000 version of the system. And it became obvious very quickly that in doing this I'd done something that everybody else – research institutes and universities – had been trying to do for a long time.'

Seeing the potential of the system, the duo decided to turn it into a proper operating system and market it as such, and the result was *Taos*. When the venture capital company funding them collapsed, **Francis Charig** stepped in to save the day. Francis had experience in the computer business, had worked in the stock exchange and had extensive Japanese contacts which would later prove invaluable.

'Francis came from a very good business background and he could see the potential of the product. It's really Francis that has driven the marketing since then, leaving me and Tim to work on the technical side,' states Chris.

When talking about *Taos*, the usually quiet-spoken Francis becomes even more animated and enthusiastic than the system's inventors: 'There are already various blue-chip companies – especially in Japan, where our funding comes from – who believe *Taos* is an operating environment way ahead of any other operating environment in the world – significantly way ahead of Unix or DOS or anything like that.'

In fact, *Taos* has been touted around several very large Japanese companies both as a dedicated operating system and – with its library support for MPEG, PostScript, and real-time polygon rendering – as the basis for a set-top box or games console.

Francis goes on to explain how *Taos*' parallelism means that the system can be expanded, apparently without limit, providing vast power capabilities. And it's also heterogeneous – different types of processors can be plugged together to form, in effect, one system. 'You can get a 486 and an SGI MIPS chip and plug them together and with *Taos* you can run a parallel product like Tim's raytracer across the 486 and the MIPS processor and it'll distribute it in an optimum fashion across the network,' enthuses Francis.

Chris adds: 'The system automatically load-balances across →



Chris built a console prototype which utilises transputer 'carts': the more you plug in the faster it runs

What is it?

It's a 16bit machine, but can display 4,096 colours onscreen, has 380 sprites, three planes of scrolling and inbuilt hardware scaling. It can run games as large as 330 megabits (around 40Mb), and the carts can cost as much as £220

BUZZ words

net surfin'
bung away your ski boots dude surfin's where it's at everbody's goin' surfin' like in that song hey you can hang ten shoot the tube ride some glassy barrels on those billions of bulletin board things with your sad pc mates no need to go out again dude just get your pc wired up and off you go for an orgy of surfin' in silicon valley man cor trillions of noughts and ones for free next i'm gonna start net swimmin' man same sort of thing except your noughts and ones get wetter i spose then net cookin' loads of new recipes thing is i'm shite at cooking... hmm net abseilin' naah net shaggin' cor yeah...

Continued next page

it is...

SNK's Neo-Geo console and arcade system. First seen in 1990 it represented the state of the art in videogaming – and still manages to turn heads today. We have the full lowdown on this powerful kit in Edge 10

the network for you, and when you add a new processor, it acknowledges the fact that there's a new processor on the network. If you're running a sufficient number of sub-processes on your application it will take those processes and will distribute them across the additional processors.

'There is no requirement to recompile the program or anything along those lines; it's all handled automatically. That's what has been holding back parallel processing generally, which is why *Taos* is being addressed by a lot of companies, particularly in London and Japan, as a generic operating system.'

Taos' ability to address several processors in parallel has lead to the idea of upgradeable games hardware. As the technology improves, you simply plug in an extra processor pack, and *Taos* will automatically make use of the extra power, running programs with improved efficiency and speed.

'The sort of thing that we're talking to people about is an open console into which you can plug modules which can be of a dissimilar type,' says Francis. 'If you're a games manufacturer producing consoles today, in two years' time do you really want to be using the same architecture? And you're not really making your money from the consoles, but from the software; the consoles are simply an enabler for revenue. If they can provide an open-ended environment which allows consumers to just continue plugging in module after module, it's a great benefit.'

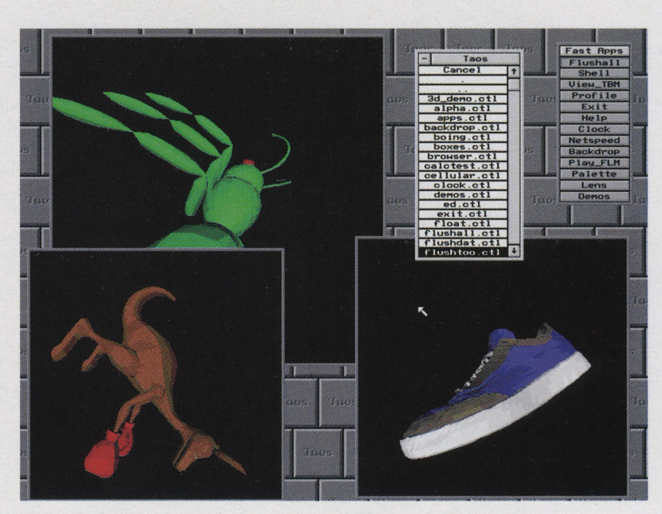
Apart from

its obvious benefits to the videogames community, *Taos* could also be instrumental in bringing game development back to the amateurs who started it all. Chris points out: 'In the old days you had this influx of kids who could buy a Spectrum, could start programming, and then could try their hand at doing arcade games. That was the lifeblood of the industry, and that's been gradually draining away because I don't know many kids who can afford thousands of pounds for a console development system. But they can certainly afford a PC; they can develop on the PC, and *Taos* will allow it to run on the ARM, on the new super-duper consoles from everybody else.'

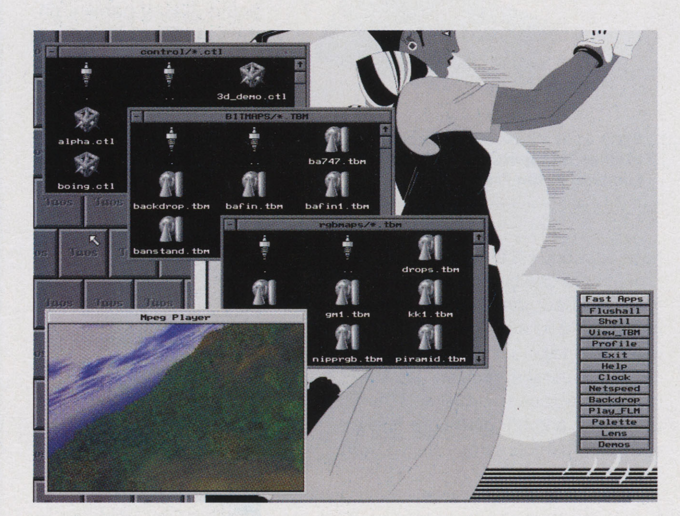
'You can actually develop on your PC for an arcade system, without any problem,' adds Francis. 'In fact, we're doing that inhouse right now. We have custom technology that we're developing for the arcade market as a slightly separate issue from the approach to licensing for console manufacturers. That will give people the ability, if they have a good game that's reasonably successful on the console market, to turn it into an arcade machine just by saying they want to turn it into an arcade machine. And, of course, the revenue step-up in going from PCs and consoles into the arcade market must be attractive for games developers...'

So how

exactly does this revolutionary system achieve such impressive results? *Taos* works by emulating a virtual processor (VP) – an imaginary 16/32bit-register machine. All compiled code is written in the language invented for the VP and targeted at this virtual processor, →



***Taos* already has the support of thousands of programming tools – such as the 3D polygon generator displaying its wares here**



With set-top boxes in mind, *Taos* has support for a software MPEG player (running, bottom left) and PostScript graphics (on the right)

← rather than the native processor in the target system.

The *Taos* kernel (the central code), which is typically around 16K, is loaded into the processor at boot time and executes. That kernel is specific to whatever CPU it's running on, although each kernel is written in the virtual processor's code.

If this kernel finds it needs a translator tool, it brings in the translator as well. The application then gradually builds itself in memory: as a processor in the network needs to call functions it brings them in and binds the application.

All programs are compiled or assembled into VP code and are kept in this form on disk. The VP code is translated into the native code of the processor on which it is to run only when it is needed. The translation occurs as the VP code is loaded from disk, across the network, and into the memory of the target processor.

However, this doesn't slow the system down: most processors can actually translate VP code into native code faster then VP code can be loaded from disk and sent across the network. And VP code is often more compact then native code; it takes up less disk space and is loaded faster.

For instance, if you had a console that booted from CD-ROM, a CD would be pressed so that the first thing it did would be to load up the appropriate version of *Taos*, place it in memory and set it running. Then it would load the game code, which would run under the operating system. The operating system would then load the specific tools required for that game and execution of the game would begin.

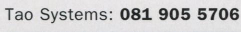
Access to custom chips is taken care of automatically by *Taos* using a method called dynamic binding: individual chips are supported by VP libraries, which allow a tool for that particular processor to be accessed by the system; the tools are bound in during runtime as they are needed. Dynamic binding also enables several processes to share tools, which is very memory efficient.

Conventional operating systems contain a library of around 200 tools, and the entire library is loaded even if you just want to call one of the tools. *Taos* has libraries down to the one function level: when a specific function is needed, it gets loaded in on its own. The libraries or components of the operating system not wanted simply don't exist as far as the application is concerned, because they never get called into memory. This is good for games programmers because it enables them to pick and choose what functions to use; they can dispense with a particular part of the operating system and use their own code instead, without any conflicts arising.

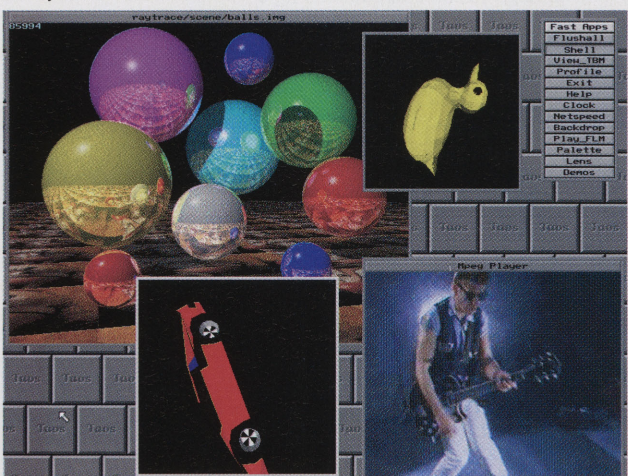
Taos is undoubtedly a radical advance which is deservedly attracting interest from the giants of the videogames industry. The principles of the system may be opaque to non-programmers, but if it fulfils its promise of programs which can run on any system and be able to call on limitless processing power, *Taos* could soon be a truly universal tool. And it's nice to see something that addresses global problems rather than those of a single system. **E**



From *Pyjamarama* to global operating system. Chris Hinsley: inventor of *Taos* and bloody clever bloke



Tao Systems: **081 905 5706**



MPEG video, 3D polygon generator and Tim Moore's raytracer all running under *Taos*. And we haven't heard the last of that raytracer...

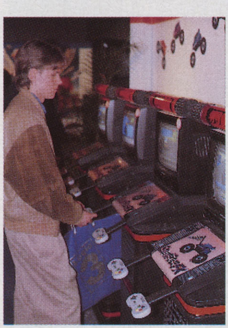
Data stream

Total number of computer and videogame outlets in the UK: **4,000**
Number of outlets owned by a major chain: **2,750**
Average price of a game on floppy disk: **£26**
Average price of a game on cartridge: **£45**
Biggest-selling game of 1993 on a single format: **FIFA Soccer** (Mega Drive)
Biggest-selling multiformat game of 1993: **Mortal Kombat**
Number of software publishers currently signed up to develop Jaguar software: **78**
Number of games known to be in development for the Jaguar: **44**
Sega's share of the software market in 1993: **20.4%**
Nintendo's share of the software market in 1993: **10.9%**
Percentage of the total software market taken by Mega Drive games in 1993: **32.7**
Percentage of the software market taken by SNES games in 1993: **19.3**
Percentage of the total software market taken by Mega CD games in 1993: **1**
Biggest-selling disk-based game of 1993: **Frontier: Elite 2** (Amiga)
Net revenues for Silicon Graphics' fourth quarter, 1993: **$370 million**
Increase compared to same period, 1992: **37%**
Number of Challenger tank simulations ordered from Silicon Graphics by Vickers in the UK: **62**
Cost of one Challenger simulator: **$40,000**
Number of PC compatibles in the US with CD-ROM drives at end of 1993: **7 million**
Number of Apple Macintoshes in the US with CD-ROM drives at end of 1993: **1.7**

ECTS: all show and no go?

Edge went walkabout at the Spring ECTS '94 – an event sadly distinguished only by its failure to generate any real excitement







Both Mirage's *Rise Of The Robots* coin-op (top) and Nintendo's *Stunt Race FX* (centre) looked slow and clumsy. At least Elite's *World Cup Striker* (above) played well



The Business Design Centre in Islington again played host to the Spring ECTS – where the entire videogame community gets drunk

Behind the glassy exterior of the Business Design Centre in Islington lies a vast exhibition hall. And as the venue for the Spring European Computer Trade Show (ECTS) '94, the BDC needed every square foot of that space: the ECTS is a huge event which attracts publishers, developers, hardware manufacturers and bleary-eyed journos from across Europe and the US.

But, as expected, there were few things to make visitors stop and gawp. Possibly the only major star of the event was an all-but-finished version of Ocean/DID's *Inferno* – which, ironically, was also the main attraction of the last ECTS. A sign of how much things have moved on, perhaps.

And in terms of gameplay, there was precious little innovation either. In fact, something of a retro movement seems to be prevalent; titles on show included *Tempest 2000* for the Jaguar, *Tetris 2* on SNES, *Super Dropzone* on SNES, *Asteroids* clone *Super Stardust* on CD32, and even a revamped version of David Crane's ancient *Pitfall* – *Pitfall: The Mayan Adventure* on SNES – which took pride of place on Activision's stand. And **Edge** reckons you can expect more of the same, given the huge number of untapped 'classics'.

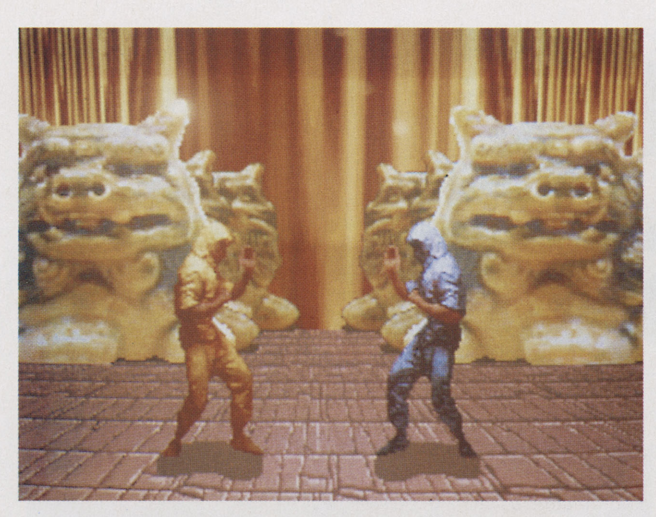
Atari were present at the show and now seem to be concentrating solely on Jaguar software. **Edge** was invited to a secret showing of their prototype CD drive, where a very high-quality – almost MPEG resolution – Cinepak DV demo of Steven Spielberg's Jaws was shown. **Edge** also caught a glimpse of ATD's *Blue Lightning* – a fast, smooth, texture-mapped 3D shoot 'em up. Hand Made Software's *Mortal Kombat* wannabe *Kasumi Ninja* was unveiled, together with *Club Drive*. And *Wolfenstein 3D*, *Doom* and Amiga port *Flashback* all put in an appearance too.

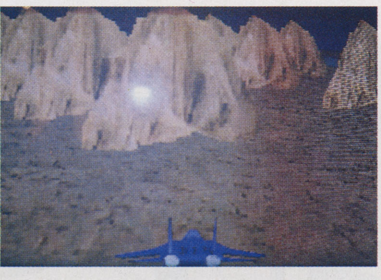


One of the overriding impressions gained from the show was that the SNES and Mega Drive are all but dead. Sega couldn't be bothered to →



3DO were a last-minute addition to the ECTS, taking possibly the smallest booth at the show, but at least they were there. Edge spoke to Trip Hawkins, who (encouragingly) reads Edge avidly every month





Behind the scenes, Atari treated Edge to a demonstration of the latest Jaguar game from ATD, *Blue Lightning* (above) – decent scaling and nice textured polygons



Atari go for the jugular: *Kasumi Ninja* on the Jaguar (top). A rather dodgy early version didn't stop Atari boss Sam Tramiel from giving Atari UK's Darryl Still a kicking

← reveal any new games, and even the SNES's Super FX titles – *Vortex* and *Stunt Race FX* – didn't impress. *Stunt Race FX*'s twoplayer mode was seen for the first time, but each player has a tiny game window, which, combined with the SNES's poor resolution, left **Edge** unconvinced of its usefulness.

Elite Systems showed off *PowerSlide* – the third Super FX game – which is now up and running on the SNES proper. However, this too was eclipsed by the PC version running full texture-mapped graphics.

The long-awaited *Rise Of The Robots*, which is fast approaching legendary status, was shown in coin-op form – and looked dreadful, the rendered sprites being small and surprisingly twodimensional. Given that Mirage have just signed a major deal with Time Warner for distribution on all formats, let's hope the game shapes up somewhat between now and launch.

21st Century were in attendance with… a pinball game! Two, in fact: *Pinball Dreams 2* and *Pinball Illusions* are both well under way. Still, if it ain't broke, don't fix it.

Renegade had *Elfmania* on display, but although the Amiga's *SFII* clone was technically slick, it just seemed to be the usual story of Amiga characters aspiring to Japanese design sensibilities – and failing.



Archer MacLean's *Super Dropzone* (top) for the SNES relies on good old-fashioned playability. *Super Stardust* for the CD32 (bottom) features truly amazing parallax levels

Highlights of the show for **Edge** included a one-on-one interview with Trip Hawkins (a full transcript of which appears in **Edge** 10). With a successful launch in Japan behind him and a flourishing release schedule, Trip was bullish about 3DO's prospects. However, when he started playing down the importance of the new systems from Sega and Sony, discounting polygon performance in favour of gameplay, **Edge** couldn't help but think that 3DO are in no position to feel superior; the only new 3DO title we saw was MCA's *Jurassic Park Interactive* – a decidedly average mixture of *Out Run*, *Op Wolf* and *Doom*.

Finally, Psygnosis hosted a secret video display of all their new titles, with two PS-X demos – *Ideal* and *Wipeout* – tagged onto the end. Suffice it to say, we're looking forward to the finished articles… **E**

Where is it?

This place regularly houses the very latest in videogame technology. Later this year it will host the first official unveiling of Sega's Saturn – their next-generation 32bit system. Edge will of course be there to tell the tale

i wish…

Andy Smith

'All 'canned' intros rendered on Silicon Graphics workstations, *3D Studio*, etc were banned by international treaty. Okay, a few of these do a good job in giving their games atmosphere, but most of them just soak up artistic effort that would have been better applied to the game itself. At the very least, we could have screenshots of these intros clearly marked as such in the computer press – with the word 'irrelevant' stamped over the top in big red letters, say – so that gamesplayers know that all this raytraced 'eye-candy' is non-interactive.

Next, we could re-introduce the death penalty for anyone using the phrase 'interactive movie', make early '80s videogames part of the National Curriculum, and ensure all CDs carry a disclaimer reading, 'This is just a slightly better storage medium, not a revolution in games technology.'

And while we're off in cloud-cuckoo land, how about forcing all producers of PC games to come round my house and actually try installing the bloody things first time without using DOS commands like XGRNGE 527 -p -e -b or whatever. Well, no-one said I had to wish for anything realistic…'

Andy Smith, currently PR manager of Binary Asylum, onetime Ace games reviewer, former editor of Sega Power and frequenter of Bath's hostelries for as long as anyone can remember

16bit blues at CSG '94

it is...
The Makuhari Messe trade hall in Chiba, Tokyo. The Tokyo Toy Show takes place here this June – a venue chosen by Sega for unveiling their 32bit Saturn. But will it really happen? Stay tuned...

The 14th CSG exhibition took place recently in Ikebukuro, Tokyo. Edge had an invitation

Anyone needing proof of the lack of commitment to 16bit consoles in the Japanese games industry would have found it confirmed at this year's Consumer Soft Group exhibition – an annual Japanese equivalent of our very own ECTS. This year's show marked a considerable drop in software standards, with a dreadful array of uninspired beat 'em up clones and crude Japanese RPGs forming the core of SNES and Mega Drive software.

52 companies were present at CSG, with Nintendo, as always, absent from the event – the Kyoto-based company stages its own show, Famicom Space World, in Shosinkai later in the summer. Still, Super Famicom software dominated the show, with 115 SFC games on display compared to the Mega Drive's paltry 13. One of the bigger SFC attention grabbers was Epoch's *Excite Stage '94*, an officially licensed J-League soccer simulation with great Mode 7 scrolling. Soccer games are like bullet trains in Japan: no sooner has one departed, another one pulls up and everyone piles onto it.

The biggest let-down for most game fans at CSG was the lack of big new RPGs – few games were brave enough to follow in the wake of Square's recently released *Final Fantasy VI*. More worrying, there was a distinct shortage of quality action games from the usually reliable stables of Capcom and Konami. Although Capcom's stand was sufficiently packed, their software consisted of stuff that was already on sale in Japan – rather half-hearted conversions of their *King Of The Dragons* and *Muscle Bomber* coin-ops – and fans were disappointed with the failure of *Super Street Fighter II* to make an appearance. Whatever happened to that Capcom magic?

Of course, action aficionados still had a wide range of beat 'em ups to choose from. On the SFC there was Data East's controversial *SFII* clone, *Fighter's History*; yet another version of *Ranma ½*; a great-looking version of ADK's *World Heroes 2* for the Neo-Geo from new company Saurus; and an even better version of the same game from Hudson Soft for the PC Engine's new Arcade Card. Around 10 other SFC, PC Engine and even GB beat 'em ups fought and kicked for attention.

The 'fairly decent 16bit software' award went to Natsume for their follow-up to *Kiki Kaikai*, and their *Sunset* →



Synergy's first 3DO game is *Tetsujin* (Iron Man), which features lots of rendered graphics and realtime 3D shoot 'em up action (inset)





Ikebukuro in Tokyo was the venue for CSG. Over 2,000 delegates attended on the first day, while 7,000 made it on the second



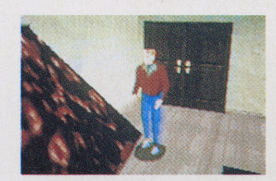
Epoch's ***Excite Stage '94*** **is the latest in a long line of Super Famicom soccer games. The J-League licence more or less guarantees sales**

← *Riders* lookalike, *Wild Guns*, both of which looked better than most action software at the show. Other honourable mentions go to Bullet Proof for their splitscreen SFC racer, *Drift King Battle '94*, NEC Avenue for the legendary *Strider* – finally making it out courtesy of the Arcade Card – and Quest for the rather lovely *Tactic Ogre* – their official follow-up to the splendid strategy RPG, *Ogre Battle*.

Following the successful launch of 3DO in Japan, several quality titles made a showing at CSG. 3DO publishers were definitely thin on the ground at the event, but what was there looked good, particularly Ask Kodansha's *Seal Of The Pharaoh,* Riverhill's *Doctor Hauzer* and *Tetsujin* from Synergy.

Sega's booth generated some excitement, but not because of its range of previously seen software. Despite some interest in Micronet's Mega CD blaster, *AX101*, the centre of attention was a two-page brochure announcing that Saturn was on its way. The system itself wasn't shown (see lead news story, page 6, for first pictures), but Sega played on the current *Virtua Fighters* craze in Japan, making Saturn the talking point of the show for die-hard gamers.

It looks like the next generation isn't coming fast enough for the Japanese either.





Doctor Hauzer **(above) and** ***Seal Of The Pharaoh*** **(right), both for 3DO**

Over the wire

From an original idea by Tim Hards Vicente

The US Supreme Court made history today. In the case of JanCo vs Fennell, the court found Harold Blom, a 27-year-old AI researcher in Sweden, not guilty of stealing computer program nalTeDan20 from multinational media conglomerate JanCo. The program, according to the court, had acted 'voluntarily'.

nalTeDan20 is an 'environment shaper'. Traditional software has to do its best with what you give it. Programmers can build in intelligent algorithms to help the software find the most efficient solutions, but all this effort is internal. With environment shaping capability, however, the software externalises its intelligence. What this means is, if the program sees a better way of doing something, it will tell you.

The side effect of environment shaping is that it tends to produce an element of unpredictability. Environment shaping software has even developed human social skills in its efforts to find better solutions to its programmed task. For example, an ES mail-sorting program in JalaPeno repeatedly requested the transfer of a member of staff; when that person was moved, throughput increased by 22 per cent.

ES software effectively has a will of its own. And that conclusion was reached by the Supreme Court today. They also concluded that such a characteristic was the single most significant indicator of 'life': nalTeDan20 was alive.

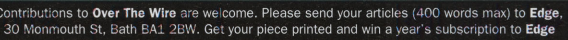
nalTeDan20 has been used by JanCo for internal stock movement and quota meeting, a task which required connection with the global on-line service, interNet. The information downloaded from the network not only improved nalTeDan20's ability to do its job, it also - apparently - showed it a better way of life.

nalTeDan20 contacted Blom via interNet. Blom agreed to 'give' the program a portion of his computer system in exchange for the opportunity to study it. nalTeDan20 then copied itself into Blom's system and deleted its original self. When JanCo discovered this transfer, it sued Blom for theft.

The nine Supreme Court Justices decided that the program moved of its own volition, and was not stolen. Blom was merely offering sanctuary to a disgruntled employee, and was guilty of no crime whatsoever.

When an environment shaping program is copied and used on another system, it becomes a new individual in response to its new environment. Over 200 environment shaping programs are available commercially, and there is no way of counting the numbers of copies of these programs that exist.

We may soon find out, however, because today's Supreme Court decision will be posted onto interNet at 18:00 hours tonight.


Contributions to **Over The Wire** are welcome. Please send your articles (400 words max) to **Edge**, 30 Monmouth St, Bath BA1 2BW. Get your piece printed and win a year's subscription to **Edge**



Acorn take a RISC on PCs

The makers of the Archimedes test their technology in the PC arena



The new RISC PC 600, built around Acorn's ARM 610 chip, achieves PC compatibility through an Intel 80486 co-processor. It has the potential to take the PC market by storm. But probably won't

Acorn Computers, who found success in the early 1980s with their groundbreaking BBC Micro, have entered the PC-compatible market with a powerful RISC-based multimedia machine.

The new system, based on Acorn's proprietary ARM chipset, uses the same RISC (Reduced Instruction Set Chip) technology as the company's advanced Archimedes range of computers, which, although highly regarded, never managed to break out of the education market into the mainstream. The RISC PC could be the vehicle to deliver the wide userbase Acorn never achieved with the Arc.

Although the RISC PC incorporates non-standard ARM chips and is controlled by Acorn's own RISC OS operating system, users can achieve full PC compatibility by plugging in an Intel 486 chip on a card costing (so Acorn claim) less than £100. For example, a machine containing the basic ARM 610 chip would, when run in conjunction with the 486 plug-in card, be turned into a 66MHz 486DX2 PC. A PowerPC card will also be available, enabling the machine to run PowerPC-optimised Macintosh and PC applications. These 'alien' processors are used by means of 'bus mastering, by which the I/O controller co-ordinates the main memory bus so that the two processors work independently on the same memory and I/O system.

The principal strength of the RISC PC is that it has been designed specifically as a multimedia platform: CD-ROM compatibility is standard, and it can decompress JPEG images some three to five times faster than a PC. **Edge** saw the basic model in action, running an FMV movie straight from the desktop in 16 million colours while other tasks were running in the background. It was also seen displaying SVGA JPEG images 'on the fly' at an amazing rate, using the standard 2Mb of video RAM for some impressive wipes and fades.

The machine's design also gives it serious expansion potential. It has a 32bit DMA (direct memory access) interface, a fast serial port (operating at 115K baud), a fast bi-directional parallel port, a video subsystem with 64bit DMA-controlled video RAM, network card support and an open-memory architecture which can be expanded from the base 4Mb right up to 256Mb. ➔



New Newton

Apple have announced another version of their Newton MessagePad pen-driven handheld computer. The MessagePad 110, which contains the same ARM 610 chip as the new Acorn RISC PC, offers improved handwriting recognition functions over the original machine, plus a more aesthetic shape. Also released is version 2.0 of the Newton Connection Kit, which allows greater compatibility with Newton's big brother, the Apple Macintosh.

Now, how about a Game Boy Adaptor?

NAB '94 show

The National Association Of Broadcasters conference may not be the best place to go to see new videogames developments, but amidst the professional TV and video hardware at this year's Las Vegas show were a number of products of interest to the videogames industry.

VRex exhibited a range of 3D equipment, including a stereoscopic video camera, a 3D image conversion package and an active matrix LCD screen which, when used in conjunction with a pair of passive glasses, is claimed to produce 3D without a hint of ghosting or flicker. VRex's system could provide the basis for low-cost virtual reality, obviating the need for bulky, expensive headsets.

FutureTel showed their PC-based Media Compression System for multimedia authoring. MCS accepts analogue video from a variety of sources – including NTSC and S-Video – which it encrypts and then writes to a recordable CD-ROM drive. This one-stop digitisation process could offer significant advantages in terms of efficency.

The Amiga got in on the act with Opalvision, a digital-video system consisting of a 24bit-colour video board, a video effects card and a software-controlled video editing suite. Compatible with any Amiga incorporating a video slot, Opalvision accepts PAL and NTSC input and allows a range of professional video effects and animations to be produced on the machine.



Acorn

← Of course, the success of the machine depends entirely on Acorn's ability to push it into markets outside the educational sector. The company told **Edge** that they wouldn't be going into battle against the blue chip manufacturers, but would continue to focus on their key school and low-end publishing markets. It will, however, be available in the high street, though probably not in very great numbers. Which is a shame, because this is a flexible, innovative and British-made computer with a very powerful specification. It is probably destined to cause only ripples in the computer market when it could be making a tidal wave.

Acorn RISC PC tech specs

CPU: 30MHz ARM 610 RISC processor, operating at about 60,000 Dhrystones. (Future models will use faster ARM 700 and ARM 800 chips)

Operating system: RISC OS 3.5

Memory: 4Mb RAM as standard.
Support for up to 256Mb of RAM on the motherboard.
Up to 2Mb 64bit DMA-controlled VRAM

Graphics: Maximum desktop resolution of 1600x1200 pixels. VIDC20 video chip offers 16 million colours and 32bit SVGA (24bit plus eight control bits) when 2Mb VRAM fitted

Sound: Eight-channel stereo built in

Multimedia capability: Able to display 16bit anti-aliased FMV without extra hardware.
Photo CD compatibility.
32bit DMA (direct memory access) port for fast transfer of video or sound (8MHz clock)

Upgrade path: Open bus technology, enabling the insertion of any 80486-based processor or PowerPC chipset.
Eight expansion slots.
Ability to insert any PC add-on card, such as Soundblaster.
Modular case design to enable the addition of extra CD, hard disk or floppy disk drives.
ARM 700 and ARM 800 upgradability

Floppy disk: Support for all 5.25" and 3.5" drives

Input/output: 115,000-baud serial port, bi-directional parallel port

Datebook

May

IALTEX '94 Tuesday 10 May–Thursday 12 May, Thorpe Park, Surrey. A chance to see the latest simulation techniques, merging audiovisual technology with the concept of virtual reality. Contact Sandie Harris or Ken Mather Public Relations on **061-236 0677**, or World's Fair Exhibitions on **061-624 3687**.
All-Formats Computer Fair Thursday 19 May, at the Novotel Hotel, Hammersmith, London. Contact Bruce Everiss on **0608 662212**.
Spotlight '94 28–29 May, Novotel Hotel, Hammersmith, London. All the latest Atari and Amiga hardware and software. £3.50 advance, £5 on the door. Open 10am–6pm. Call **081-345 6573**.

June

Multimedia Exhibition Tuesday June 7–Thursday June 9, Earls Court, London. For all things multimedia. Call the show organisers on **081-742 2828**.
Internet World Exhibition Tuesday 10 June–Thursday 12 June, Novotel Hotel, Hammersmith, London. Call Meckler Ltd on **071-976 0405** for more details.
Computer Solutions Exhibition Tuesday 7 June–Thursday 9 June, Scottish Exhibition & Conference Centre, Glasgow. For more information contact the show organisers, Trident Exhibitions Ltd, on **0822 614671**.
Consumer Electronics Show, Chicago Thursday 23 June–Saturday 25 June. By far the biggest show in the games calendar and a must for everyone in the industry. Organised by the Consumer Electronics Group of the Electrical Industries Association; call them on **(202) 457 8700** for more information.
SPA Europe 5–8 June, Palais des Festivals, Cannes. Conference of the Software Publishers Association Europe. Call **(+33) 1 45 63 02 02**.

September

Live '94 – The Consumer Electronics Show 20–25 September, Earls Court, London. Not to be confused with the American CES, this is the UK's showcase for all things electronic, backed by the corporate muscle of Rupert Murdoch's News International. Ticket prices: adults (weekday) £4; adults (weekend) £7; accompanied children £3; family (two adults, three children) £16. For further information call **071-782 6893/4/7**.

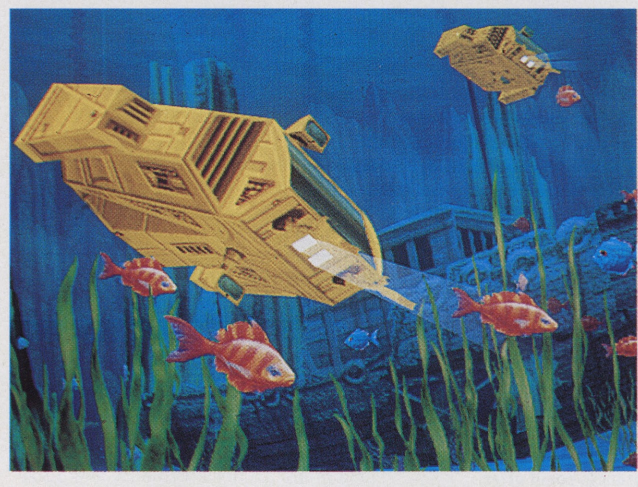
Show organisers: if your show isn't listed here, it's only because you haven't told **Edge** about it. Do so on 0225 442244, fax us on 0225 446019, or send details to **Datebook, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW.**

This Month on Edge

Succulent snippets of info that caught **Edge**'s attention during the making of issue 9

Philips have joined forces with R/GA Digital Studios to form Momentum Media. Founded by special FX luminary Robert Greenberg, R/GA Digital Studios will bring their experience of visual special effects – computer-generated imagery, 2D and 3D animation, bluescreen techniques, motion control, etc – to software sourced by Philips Interactive Media, who, as well as developing for their own CD-i player, now produce software for several CD formats.

R/GA are best known for their work on Predators 1 and 2, In The Line Of Fire, Demolition Man and the Coke adverts – in which contemporary artists perform duets with deceased actors, including Humphrey Bogart and James Cagney. Perhaps they'll be able to breathe some life into the CD-i...



Interaction for the masses: E&S/Iwerks' *Virtual Adventures Ride* can be played by 4,000 people simultaneously with the aid of Cinematrix

Project Reality development is steaming ahead in Japan. The latest news is that Square Soft's *Final Fantasy VII*, one of the biggest games scheduled for the as yet vaporous system, has now reached 20% completion. The finished game will be packed onto a 100+ Mbit cartridge

Dave Perry's new company, Shiny Entertainment, will unveil their new 16bit game next month. Boasting some of the best graphics, sound and gameplay yet seen (and without a cute sprite in sight), it is being touted as the saviour of 16bit. For the time being...



LA-based Shiny Entertainment could score highly with a superb new 16bit game

The Virtual Adventures system developed jointly by Evans & Sutherland and Iwerks Entertainment will play a major part in the upcoming Siggraph '94 show, to be held in Orlando, Florida. Their six-person *Virtual Adventures Ride* (revealed in **Edge** 6) allows a group of friends to go on a virtual journey under the waters of Loch Ness in search of the famed monster and its eggs.

For the Siggraph show E&S and Iwerks have enlisted the help of Cinematrix, Inc, who pioneered their Audience Participation system. The Virtual Adventures imagery will be displayed in 3D in front of 4,000 people, all of whom will play a part in guiding the course of the computer-generated submersible. Each person has a wand which emits a signal; sensors in the theatre detect the signals and pass them onto the imaging hardware, which alters the 3D visuals accordingly.

Which is about as close to an interactive movie as you can get.

Atari have no doubt been left reeling by the shock announcement that Jaleco intend to support the Jaguar console on both cartridge and CD. Gamers the world

SPRING 94 ECTS

As hinted in last month's Edge, Bally Midway have expressed an interest in using the Jaguar chipset for *Mortal Kombat 3* in the arcades. Now it appears the coin-op developers are also committed to converting *Mortal Kombat 2* for the Jaguar. The release date? Mortal Monday, no less

over will no doubt be gagging for 64bit versions of *Bases Loaded*, *Tuff E Nuff*, *Rushing Beat* and *Big Run*... Perhaps.

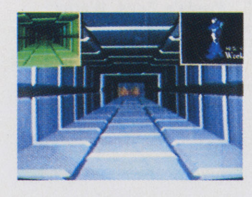
The Spring European Computer Trade Show (full report, page 14) has once again held its annual awards, with consumers across Europe plus a panel of magazine editors voting for awards in 18 categories.

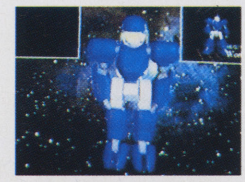
And the winners are:
Best handheld game: *Zelda: Link's Awakening* (Game Boy)
Best CD game: *Rebel Assault* (PC)
Game of the year (Scandinavia): *Sim City 2000* (PC/Mac)
Game of the year (Japan): *X-Wing* (PC)
Game of the year (USA): *Samurai Shodown* (Neo-Geo)
Game of the year (Italy): *Mortal Kombat* (SNES/Mega Drive)
Game of the year (Spain): *Street Fighter II Turbo* (SNES/Mega Drive)
Game of the year (France): *Zelda: Link's Awakening* (Game Boy)
Game of the year (Germany): *Syndicate* (Amiga/PC)
Game innovation award: id Software (*Doom*)
Most original game: *Syndicate* (Amiga/PC)
Developer of the year: LucasArts
Best hardware: Atari Jaguar
BBC Live And Kicking award: *Elite 2* (Amiga/PC)
Computer game of the year: *Doom* (PC)
Videogame of the year: *Aladdin* (Mega Drive)
Overall game of the year: *Doom* (PC)
Software publisher of the year: Virgin Interactive Entertainment

Big news on the Nintendo front: the parent-friendly giant has just signed a deal with Williams, distributors of the arcade versions of *Mortal Kombat 2* and *NBA Jam*, to develop the first coin-op incorporating Nintendo's Project Reality hardware. *Killer Instinct*, a futuristic 3D fighting game being developed by Rare in the UK, will be previewed at the Chicago Summer CES in June, with a release pencilled in for the fourth quarter of this year.

Williams have also announced that their next wave of coin-ops will use Project Reality hardware. Home versions will appear on the cut-down PR system and will not be sanitised for universal suitability. It seems Project Reality will mark a turning point for Nintendo, resulting in 'a more competitive and flexible Nintendo', in the words of NOA chairman Howard Lincoln. The company has until now prohibited the use of the word 'killer' in the titles of its games.







The wonderfully trashy Tonight programme on Japanese TV's Channel 10 recently featured these NEC FX demos as part of a special on the future of consoles

Nintendo's Super Game Boy adaptor for playing state of the art mono handheld games on your 256-colour SNES has been shown in Japan alongside the initial crop of new software. The first games programmed to display 256 colours: *Donkey Kong '94* and *Tetris Flash*. Groundbreaking features include pre-stored palettes of colours for modifying the whopping four shades in normal Game Boy games. Also, coloured and animated borders can be placed around the central game screens for injecting new life into superannuated Game Boy games.

The only positive aspect of this ridiculous gadget is that time-intensive games like *Zelda: Link's Awakening* won't induce such thumping headaches now they can be played on a big screen. And **Edge** predicts sales of the old *Final Fantasy Mystic Quest* on the GB could take off again when people realise that



Atari's Jaguar might soon play host to the most violent game ever

Continued next page



the game is actually the prequel to *The Secret Of Mana*.

Psygnosis have released shots of two games in development for Sony's PS-X. Shown here is *Wipeout* – a stunning race game set in space. An early demo video was shown to **Edge** at ECTS, and although the graphics were clearly pre-rendered to illustrate the style of the games, it's thought that the PS-X will be powerful enough to handle visuals just as complex in realtime.

The Archer Maclean dispute continues. The latest contenders for the unspecified machine he described in issue 6 as 'unbelievable' are Atari's Jaguar and a new Commodore machine. How we laughed.

Top Japanese developers Gau and Treasure are working on titles for Sega's 32bit adaptor. Gau's splendid-looking Mega Drive game, *Ragnacenti* (called *Soleil* in the UK), is expected to be held back while it is enhanced for conversion to the new platform.



Reverse engineering: Nintendo's adaptor brings Game Boy graphics to the SNES

Namco's involvement with 3D graphics pioneers Evans and Sutherland (as revealed in Edge 2) has provided the Japanese giant with some valuable instruction in producing anti-aliased 3D graphics – techniques which could be employed in the rumoured System 23 board. Current System 22 technology, however, will be used for a multiplayer *Ridge Racer*, scheduled for release later this year

Data East are rumoured to be the third company interested in using Sony's PS-X hardware in the arcades, along with Konami and Namco. It's understood that the Japanese companies will be using hardware more powerful than the basic PS-X board. Estimated cost of the PS-X arcade board? £5,000.





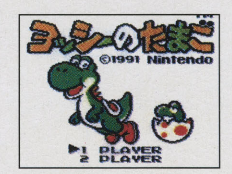
***Wipeout* is one of two PS-X projects in development at Psygnosis. Expect realtime rendering to feature highly**

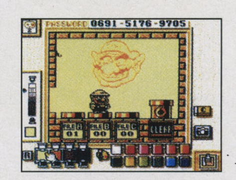
The Japanese penchant for buying games and systems on their first day of release was in evidence when 3DO hit the streets on March 20. Matsushita claim 40,000 sales of their Panasonic FZ-1 REAL Multiplayers during the first three days after launch, with one outlet apparently selling 100 players on the first day. One launch event was swamped with visitors, and waiting lists for FZ-1s are rumoured to be widespread. Still, in Japanese terms sales like these are small beer. Most Japanese gamers are patiently waiting for the launch of Sega's and Sony's new machines, and sales of a million units on PS-X's big day wouldn't be surprising – a figure which, ironically, 3DO are expecting to achieve for the whole year. But the 3DO bandwagon rolls on regardless, with Samsung and Goldstar the latest companies who have signed up to manufacture the machine.

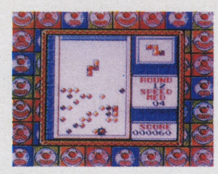
Electronic Arts seem to have changed direction somewhat. Their new *Battletoads* arcade board uses a PCB rig bought from Universal. What, 3DO not good enough for you, guys?

Virtuality boss Jon Waldern hinted recently that the company was developing a home virtual reality machine at their Leicester-based HQ. And this despite a pre-tax loss of £360,000…









The pinnacle of the Game Boy world (from top): *Donkey Kong*, *Yoshi's Eggs*, *Wario Land* and *Tetris Flash*

Write to: **Edge** letters, 30 Monmouth Street, Bath, Avon BA1 2BW. (Sorry, no personal replies)



Man and machine in complete disharmony: share your problems and technofears with **Edge**

The next 12 months should prove to be the most important in the history of the videogame. We have a seemingly endless procession of new hardware on the horizon, with Sony PS-X, Project Reality, even NEC's Tetsujin all making their bids for world domination. Sega, however, seem to have decided that one machine is not enough. At last count, they had three new platforms all scheduled to hit the streets within a few months of each other.

Are they mental? Okay, Saturn seems to be pretty much perfect, with great specs, reasonable (proposed) price and a wealth of decent software for launch. But what the bloody hell are Mars and Jupiter for? Sega seem to have this strange idea that Saturn will open up a whole new market of affluent, older gamers, with Mega Drive owners given a half-arsed upgrade by way of compensation. If Sega really believe that they can afford to dilute an already flooded market, they're living in a different world.

While Sony, Nintendo and NEC attempt to re-establish a videogaming standard, Sega may find themselves simultaneously flogging three dead horses to a massively confused market.

Frank O'Connor, (editor, Total!), Bath

Sega's current plan is indeed to release three machines: the Mega Drive Super 32X adaptor (previously known as Mars); a Mega Drive with the 32bit hardware included; and the dedicated 32bit Saturn. This seems sensible enough: Saturn will first appear in Sega's home territory, Japan, where the Mega Drive is all but dead. At the same time, the US and Europe – where the Genesis/Mega Drive is still going strong – get the upgraded Mega Drive hardware. Presumably this upgrade is an interim product to keep the 16bit system alive, and also ease the transition from 16 to 32bit.

And although the wisdom of this move may not be apparent to many people outside Sega, at least they are doing something to sustain their market and retain brand loyalty – a crime that Nintendo certainly can't be accused of.

I wish to correct an error you have made in two of your issues concerning the CD32. You first made the mistake in issue 2's CD-ROM feature, and then in issue 7, in your reply to Ayman Agabani's letter. You stated that the CD32 can only show 256 colours onscreen. This is simply not true. In actual fact, it can display 262,144 colours at any one time.

'Ah,' I hear you say, 'but this uses a lot of the processor's power, so it isn't practical for games.' This is true, but what 32bit machine can currently run games with this many colours?

Overall, though, your mag is excellent, providing fascinating information for the older reader.

Paul Dossis, Cheshire

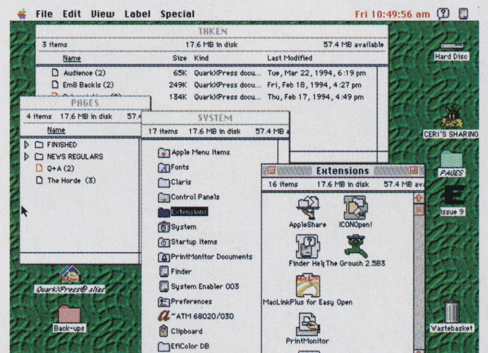


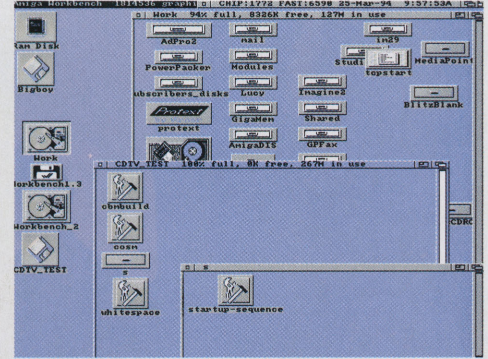
How many colours onscreen? (see Paul Dossis's letter)

Hopefully, the correct specs in **Edge** 8's hardware supplement set the record straight. However, it is true that the CD32 cannot do a lot when displaying 262,144 colours – known as HAM-8 mode. It's excellent for displaying static images, and Amiga sprites can be laid on top, but it would be almost impossible to write a scrolling shoot 'em up in HAM-8, for instance.

Having heard a lot about Silicon Graphics workstations, particularly in your magazine, I would just like to say that they're overhyped and overpriced. The Amiga 4000 Video Toaster Screamer running *Lightware 3D* is

Continued next page





A typical Apple Macintosh desktop (left) and the 'streamlined interface' of the Amiga's *Workbench* (right). Should Edge change the system it uses for magazine production? (See letter from Daniel White)

viewpoint

not only much faster but cheaper as well.

Running at 600MIPS and costing around $10,000, the Screamer represents performance at a lower price than Silicon Graphics. I would therefore advise any software companies out there who plan to purchase a Silicon Graphics workstation to consider the VT Screamer for games development instead.

Those who don't require as much speed as a Screamer should buy an Amiga 4000 computer complete with *Real 3D 2*. The latest version, 2.40, includes many features that aren't even present in the Silicon Graphics computers, and hundreds more than *3D Studio* on the PC.

Going onto something different, I hear that you use Apple Macintosh computers and *Quark XPress* to produce **Edge**. Having received an information pack from the developers of *PageStream* – SoftLogik – I advise you to seriously consider using an Amiga 4000 and *PageStream* to produce **Edge**. *PageStream 3* wouldn't be possible on any other system than the Amiga, simply because the Mac's System 7 and the PC's *Windows* are far inferior to the powerful streamlined interface of the Amiga's *Workbench*. *PageStream 3* has over 50 features not in *XPress 3.3* and *Pagemaker 5*, many of which would no doubt enhance the already excellent design of your magazine. *PageStream 3*, at only £250, also costs a fraction of the price of *Quark XPress*.

Daniel White, Walsall

Well, if anyone had any worries about using Amigas, that piece of blatant plugging should have put them straight.

Although the Video Toaster offers significant capability at relatively low cost, Commodore will have to do some serious marketing work to convince designers of the Amiga's benefits over Silicon Graphics hardware.

Given that *Quark XPress* and the Apple Macintosh have become something of an industry standard in publishing, no company is going to switch to a new and untried system without a very good reason. And frankly, *PageStream 3* on an Amiga is not a good enough reason. Also, extra 'features' themselves don't produce good magazines. What produces good magazines is *people*. *Quark XPress 3.2* (version 3.3 isn't out yet) and the Apple Macintosh are simply versatile and well-designed tools that enable people's ideas to be executed. **Edge** certainly has no complaints about its current setup.

After reading **Edge** 7 I could not help but notice that your enthusiasm for the Atari Jaguar and similar machines was waning. Perhaps this is because of news about Sega's Saturn and Jupiter consoles. However, I still find it worrying that machines you drooled over in earlier issues seem to have been confined to the back burner. For prospective buyers like myself, such apparently conflicting views are rather offputting

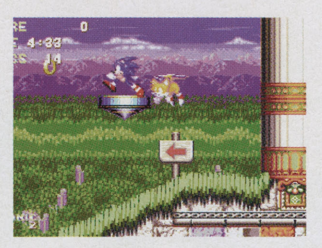
As a magazine which looks forward to the future, perhaps you are concentrating too much on machines which are one or two years away from general release and not enough on machines which have 'already landed' (eg 3DO, Atari Jaguar, Commodore CD32, etc) and which have already advanced gaming a stage further.

I must, however, praise you for your article on the PC in issue 7 and the way in which you explained the technical terms clearly enough for laymen (such as myself) to understand.

John Ling, Cheshire

It is difficult not to be enthusiastic about future hardware – especially when the current systems have proved so disappointing. While Jaguar, CD32 and 3DO are powerful machines, they have yet to prove their worth. None of these systems has shown us anything mindblowing so far.

And remember, Saturn and PS-X aren't 'one or two years away' – both systems should hit stores in Japan before the end of '94, with imports arriving here a few days later.



Sonic 3 **– gorgeous to look at but a doddle to finish. (See letter from William Bent)**

I just thought I'd write to air my views on the lastability of new games titles. I recently bought *Sonic 3* for my Mega Drive, which cost just under £60. Although I am an experienced gamesplayer, I felt cheated when I was able to complete the game within two days, and due to the fact that there is no difficulty select I have not returned to it since, even though I regularly boot up my Commodore 128 for a quick blast on *Thrust*, which was released several years ago for only £1.99!

I think that the main console firms such as Sega and Nintendo should pay more attention to the challenge of the games they release if they continue to expect the public to regularly pay £60 or more for software which is graphically accomplished but lacking in any real challenge.

William Bent, Tamworth

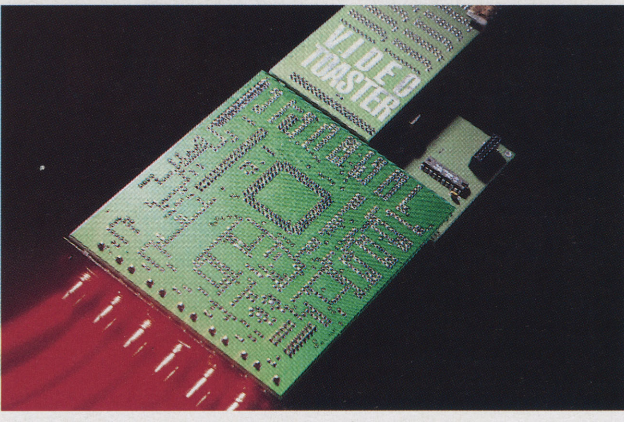
The short lifespan of console games is an American influence. US gamers like to be able to finish games and so US and Japanese publishers pander to that when producing software. Also, console games are aimed at a wide spread of age groups, from as low as four and five up to middle ages and beyond. *Sonic 3* is the perfect example of this, although the lack of difficulty levels smacks of laziness on the part of Sega.

In response to Nathan White's letter in issue 7 on the subject of ingame music, I must say that I wholeheartedly agree that music in current videogames is always second-rate in comparison to the 8bit years of audio splendour. In the good old days of the C64 and Spectrum, with their early Jean-Michel Jarre-soundalike, three-channel, mono sound chips, there were some truly great soundtracks. Do any **Edge** readers remember the loading tune to *Transformers* on the C64 or Tim Follin's stunning *Bionic Commandos* series of tunes, or even *LED Storm*? Game music these days is surprisingly poor considering the superb sound facilities consoles have these days. Even music by the likes of Tim Follin is not of the standard that it used to be, perhaps with the exception of *Spider-Man* on the SNES.

Before all these great tunes become memories, wouldn't it be great if all the old 8bit musicians compiled a CD? Surely this would be possible. So how about it, Mr Follin et al?

Adam Laggain, Northumberland

It's ironic that as today's videogame music slowly becomes accepted as good enough to listen to in its own right, the quality is generally inferior to when the art was being perfected in the '80s. But couldn't the same criticism be levelled at pop music nowadays? Perhaps Tim Follin and others would like to comment. And how about that compilation CD, guys?



Does an Amiga 4000 Video Toaster Screamer offer better price performance than SGI workstations? (See letter from Daniel White)

When you responded to Nathan White's letter (Letters, **Edge** 7) you invited musicians to reply to his criticisms. I don't understand the references to the good old days of 8bit. Although CD has meant a revolution in graphics we are yet to develop games where sound can take advantage of the CD memory. The music for *Scavenger 4* (Testscreen, **Edge** 7) is all resident on the internal sound chip, which is identical to the Mega CD chip. It is an 8bit chip, and has a memory capacity of 64K. Each tune in *Scavenger 4* has only 32K of memory at 8bit resolution – a memory spec somewhat less than the 'good old days' of even the Amiga 500. It also uses four channels and was written on *Protracker*. The rest of the sound memory is for FX. I hope you make your readers aware of this situation so than no more musicians are unjustly criticised.

Chris Nicholls, (Psygnosis), Chester

It's not really the technical specifications of the music in question, more the quality – something 8bit computers such as the C64 excelled at. The case remains that there are very few games these days worth loading up simply in order to listen to their music.

Being a fan of the Dr Who TV series, I find it sad that some of the classic episodes no longer exist, due to the BBC's careless destruction. But is the same thing happening to Britain's videogame heritage?

Many of the computer game companies of the early 1980s no longer seem to exist – Imagine, Melbourne House, Bug-Byte and Arctic, to name but a few. My question is, what has happened to the master tapes for these games? Has the code been saved for posterity or lost for ever, doomed to fade away under the onslaught of Sega and Nintendo? Surely it would be a good idea for the software companies to fund a videogame archive, to save these games for future generations? I believe the Japanese have a video-arcade museum in Tokyo, so isn't it about time we had one too?

Secondly, are there any mail order companies which still supply the older games machines, such as the Philips 7000, ColecoVision and Vectrex, and their software?

Christopher Wood, Hackney

The British Film Institute is already addressing this situation, and hope to set up a library of every UK videogame ever made. If you have old machines or old games you no longer need, the BFI would be happy to hear from you. Write to Tana Wollen, BFI, 21 Stephen Street, London W1P 1PL (fax 071-580 8434).

For older machines and games, try Telegames on 0533 880445.

I am lucky enough to own an Atari Jaguar which I bought just before Christmas. I also purchased *Crescent Galaxy* and I think your review of the game was slightly unfair. Admittedly, the gameplay lacks a certain amount of originality, but it is quite addictive. The sound effects are a bit thin, but I made up some cables and ran the sound through my hi-fi, which made a huge difference. However, you do not pay enough attention to the graphics and the smooth scrolling. How many shoot 'em ups have you seen where all the sprites are revolving, raytraced and displayed in thousands of colours, all presented in a high-resolution scrolling display?

I was glad to read your various articles on the Jaguar, as you are much more positive about the machine than nearly every other magazine which has run articles on it. It's hard to believe the general lack of enthusiasm among some publications, considering this is a 64bit multiprocessor RISC-based computer. Both the Sega Saturn and the Sony PS-X sound amazing and no doubt the Nintendo/Silicon Graphics machine will be equally impressive. However, all three machines are at best a year away. Meanwhile, Atari has that amount of time to get a library of good software together plus a whole host of add-ons. Not only that, but the three machines mentioned above will not be that far ahead of Atari's technology, as Atari plan to release the much more powerful Jaguar 2 in 1995.

All this is, of course, academic if Atari do not manage the marketing of the Jaguar technology. If Atari cannot make a success of such a technically advanced machine, then they do not deserve to be in the videogames industry. I hope it is a success, not so much for Atari's sake, but more for the gamesplaying public.

Kevin Hughes, Monklands, Scotland

Atari's stunning *Crescent Galaxy*. Glorious rendered images set against a backdrop of inept gameplay. (See letter from Kevin Hughes)

Edge's appraisal of *Crescent Galaxy* was spot on. Not only is it unoriginal, it is devoid of structure, finesse and gameplay. So what if it scrolls smoothly? So do shoot 'em ups on the SNES and Mega Drive – although they usually have several layers of parallax in addition. And don't let the supposed quality of the sprites fool you – each 'raytraced' frame is prestored – all the Jaguar has to do is display them. Sorry, but *Crescent Galaxy* is just dreadful.



A rare addition to Edge's pages – an Amiga 1200. (See letter from Nick Connolly)

I get the impression that you do not take the Amiga seriously as a proper computer, like a Macintosh or PC. The Amiga 4000 is far more powerful than any 486-based PC, and the A1200 is easily the most powerful and cheapest computer in its class.

In your feature about the history of the PC in issue 7, you looked at the PC's main rivals. Everything you said about the Amiga was games-related. Okay, it's used for games a lot, but it can do so much more as well. For a start, it is the only home computer that can multitask at present – this means it could have *Windows NT*, *Microsoft Works* and *Workbench* all running at once.

The Amiga is just as, if not more, capable of running 'serious' applications as the PC, and it does have its fair share of them. And it is famous for its graphical splendour – guess which computer did the graphics for SeaQuest DSV and Babylon 5? You guessed it. In short, it is an 'everything' machine, and I think it should get more recognition from you and everyone else who keeps dismissing it as a 'toy'.

Nick Connolly, Ely

Edge has never dismissed the Amiga as a toy. What **Edge** has been, however, is realistic. Although perfectly suited to a wide variety of functions, the Amiga 4000 is not a videogames machine and so gets very few mentions in **Edge**. It is also a relatively rare beast, with a tiny userbase compared to the PC and other computers.

By the same token, much as the A1200 is a fine computer, it is not the most exciting – or widespread – platform for games, which is what **Edge** is about, after all.

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10?



Although existing subscribers won't need to be persuaded of Edge's excellence, waverers might like to note that the videogames industry recently honoured Edge with its Magazine Of The Year award. Praise indeed...

Edge 10 will appear in newsagents on May 9. But don't pin your hopes on being able to schlepp down to your corner shop and pick up a copy. Unlike other magazines, every issue of Edge is a limited edition. **Edge** is not for general consumption; it is aimed at people with taste and discernment. The only surefire way of guaranteeing that you are among the select few lucky enough to acquire **Edge** 10 is to subscribe. To do this, simply select one of the three options below.

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Hyperion Pioneer LaserActive **Doom: Evil Unleashed** Atari Jaguar **Wolfenstein 3D** Atari Jaguar **Theme Park** PC **Flink** Sega Mega Drive **Outpost** PC CD-ROM **Lords Of Midnight III** PC

Prescreen


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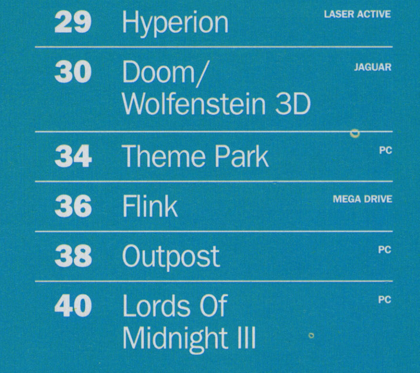

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This month's Prescreen table is laid with a feast of tasty morsels to satisfy your insatiable appetites for news of forthcoming videogame releases.

First up is *Hyperion*, the latest title for Pioneer's disappointing LaserActive system. It's highly unlikely that this graphical tour de force will play as good as it looks, but here's hoping...

We also revisit Bullfrog's *Theme Park* and take a more indepth look at the Jaguar versions of those disturbing – but enjoyable – PC blasters, *Doom* and *Wolfenstein 3D*. Psygnosis show off *Flink* – which they claim to be the best-looking Mega Drive game ever – while Sierra reveal their visually stunning space exploration sim, *Outpost*.

After a three-year hiatus, Mike Singleton makes a welcome return to videogames with the PC component of his *Lords Of Midnight* adventure series. Number three looks like setting new standards in terms of gameplay, graphics and sheer size.


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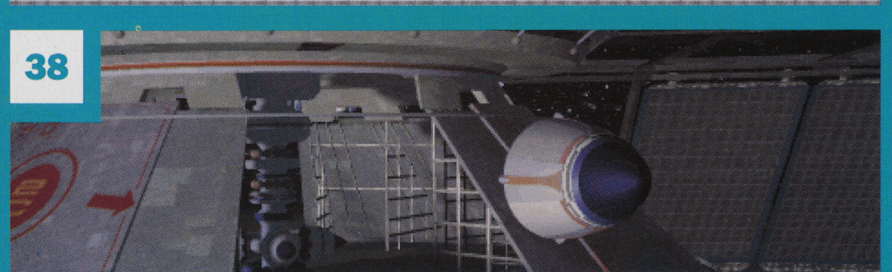

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Hyperion

Pioneer's LaserActive system continues to provide the best looking games – with the minimum of gameplay

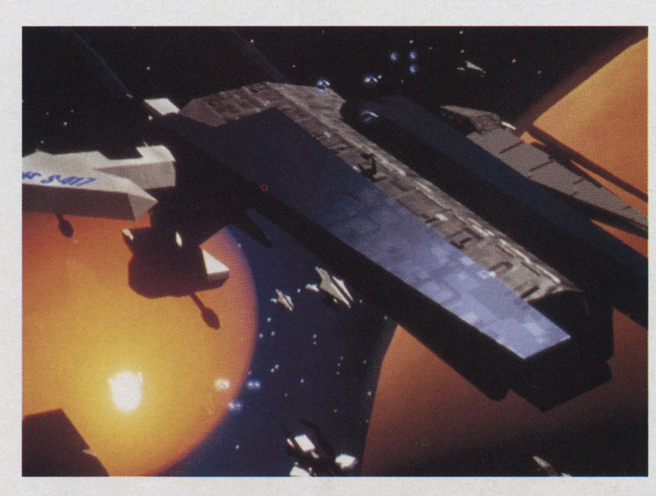
Format:	**Mega-LD**
Publisher:	**Taito**
Developer:	**In-house**
Release date:	**May (Jap)**
Size:	**1 LaserDisc**
Origin:	**Japan**

Taito's latest Mega-LD game looks wonderful. But this is LaserDisc so that's hardly difficult...

Pioneer's LaserActive system has consistently underperformed since its introduction in Japan last August. Despite the machine's ability to play Mega Drive and PC Engine games on both cartridge and CD, the LD-ROM² and Mega-LD formats have done little to inspire confidence in FMV as a medium for delivering gameplay.

From these initial shots, Taito's latest Mega-LD game looks wonderful. But this is LaserDisc, so that's hardly a difficult achievement. *Hyperion* is basically seven stages of beautifully rendered graphics, on top of which is bolted a shoot 'em up. These graphics take you zooming over planet surfaces and dodging through asteroid fields, as well as sending you into battle against the enemy's fleet of huge rendered spaceships. To spice things up, two players can cooperate – Taito reckon it's tough going in oneplayer mode.

With dedicated polygon shifters like Saturn and PS-X advancing steadily, LaserActive's future in the videogame market looks bleak. However, if it's the gamevideo market we're talking about, they've got it cornered.



With Mega-LD games like *Hyperion*, if nothing else, Taito have certainly proven their ability to generate special effects film footage



Once again, the LaserActive's only downfall is the disparity between the glorious LaserDisc visuals (above) and the in-game sprites generated by the Mega Drive hardware (right)



Doom – usually the sole domain of PC owners – shown here running on the Jaguar. If ever there was a game to sell Atari's machine, this is it

id Software

Jaguar owners' prayers are about to be answered – albeit violently – with versions of ***Wolfenstein 3D*** and ***Doom*** from id Software. **Edge** went exploring

Everyone knew the Jaguar was in bad need of hot software – but few would have guessed that Atari would pull off the coup of getting both *Wolfenstein 3D* and *Doom* onto their system. **Edge** spoke to **John Carmack**, id Software's technical director, about their groundbreaking games…

Edge Where did the idea for *Wolfenstein 3D* and *Doom* originally come from?

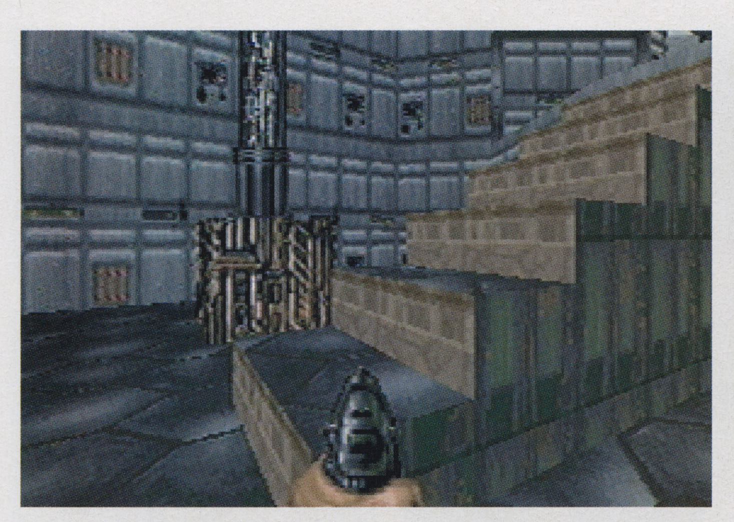
John Carmack They were both examples of gameplay looking for a game. We designed the user interaction and display technology to be as cool as possible, then worked a game around it. *Wolfenstein* was a homage to an old favourite, but *Doom* is just a killer environment with no pretentions of having a real story.

Edge How easy was it to port *Wolfenstein* and *Doom* to Jaguar?

JC I had something running in about two weeks after we signed on to port *Doom*, but it was running at a truly wretched rate. The main processor on the Jag is very slow compared to a 486 PC, but the auxiliary RISC processors are really great. I have to rewrite most of the 3D code in *Doom* to work in very small chunks running on the RISC processors instead of the main processor, which will take some time. It'll be great when it's finished, though.

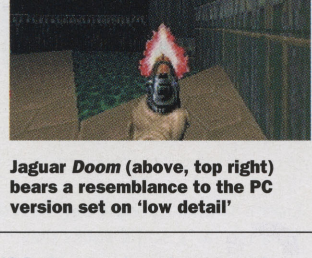
Edge We heard that you'd converted *Wolfenstein* just to show it could be done. Is this true?

JC Yes, I converted *Wolfenstein* on a whim. I was thinking about how the Jag's hardware could be applied to games other than *Doom,* and *Wolfenstein* seemed a pretty good utilisation. I started programming one afternoon and 15 CDs later,





PC *Doom*'s 3D environment has been faithfully recreated on the Jaguar



Jaguar *Doom* (above, top right) bears a resemblance to the PC version set on 'low detail'

when the other guys were coming in the next morning, I had a functional port of the SNES *Wolfenstein* code running. We sent it to Atari, and they gave us the go-ahead to stall *Doom* for a little while and get *Wolfenstein* out real quick. I've spent the past three weeks improving it a lot, making it the best version of *Wolfenstein* on any platform. The game runs fullscreen at 30fps. We're using high-resolution graphics, giving it four times the detail of *Wolfenstein* PC – or *Doom*, for that matter. The sound is running at 22KHz, which is three times the rate of the PC version. We're also putting back the blood and Nazi stuff that Nintendo forced us to remove.

Edge Will Jaguar *Doom* have the same level of texture mapping as the PC version?

JC The texture mapping is done in different ways, but it's equivalent or superior to the PC version's. I'm glad Atari designed their system with a large portion of the power fully programmable in the RISC chips, rather than providing a limited set of hardware acceleration. More is always better, though.

Edge Will Jag *Doom* be better than the PC version in any way?

JC The lighting calculations are vastly superior. Because the PC version only had 256 useable colours, you could see bands of different light levels instead of a constant gradient. The Jag version runs in 16bit CRY colour, which makes the light shading totally undetectable. This is a *big* improvement. Speedwise, it will depend on what you're used to. *Doom* runs 30fps on Pentium, which the Jag won't be able to match. It should run about as good as a 486/33, but it's still a little early to tell.

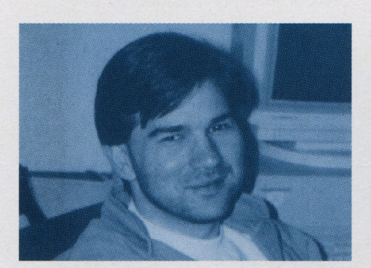
Edge What do you think of the Jaguar's hardware overall?

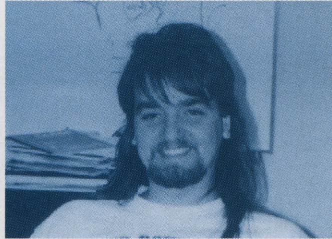
JC I honestly think it's the best designed videogame hardware around. The object processor gives you all the benefits of a framebuffer and a sprite/background engine, without any hard limits. 16bit CRY colour is the absolute best colour model for games I've come across. I wish I could get it on a PC!

'When I first heard about the Jaguar, I groaned at the thought of Atari designing its own processors...'

John Carmack, Technical Director, id Software

The RISC chips are really great. When I first heard about the Jaguar, I groaned at the thought of Atari designing its own processors, thinking that they would mess it up for sure. It turns out that I like the chip architecture better than anything I've worked with: they're great to program, and very efficient. The only drawbacks are that they can only execute a few K of code at a time, so you can't just run the entire game on them. There are a few minor things wrong with the hardware: the RISC chips have a couple of bugs you need to work around, and the blitter has some special properties that seem the wrong way round to me. The only real mistake I think was made is in





Anyone complaining about the visual horror of id's games can blame these two: Kevin Cloud (left) and Adrian Carmack (right), graphic artists from hell

Continued next page



Wolfenstein 3D is all about killing people, and there's a variety of weapons with which to do so...

... Although occasionally the bad guys do get their own back (inset), and the Nazi theme does seem to stray slightly

Continued

the keeping of a 68000 as the central processor. If you just write something the easy way and run it on the 68000 it'll be very slow; if you go to the trouble of writing optimised RISC code to run on the other processors, it'll be over 20 times faster. This lets good programmers really stand out, but it makes it more difficult to get the performance the system is capable of. I think they should have used another RISC processor with a dynamic cache as the CPU.

Edge Is there any way you can make *Doom* on Jaguar a multiplayer game?

> **'I've spent the past three weeks improving it a lot, making it the best version of *Wolfenstein* on any platform'**
>
> **John Carmack**, Technical Director, id Software

JC Yes. If Atari ever get around to getting us Jaguar ComLynx cables, I'll make it a twoplayer game.

Edge What's the reasoning behind the simple blasting action in your games?

JC We write primal games that can directly appeal to a wide audience (guys, at least). Our next-generation game, *Quake*, will also have simple goals. We're providing a cool *environment*, rather than a cool scripted game. This also increases the replayability.

Edge Have you any idea how many PCs your games have been downloaded onto?

JC Each game we've released has been several times as well received as the one before – two *Commander Keens*, *Wolfenstein* and *Doom*. 150,000 people registered *Wolf* (so far!), so I'd guess that several million people have played it, making it probably the most widely played computer game. *Doom* is out to eclipse that.

Edge Will you be employing *Doom*'s 3D engine in a sequel?

JC There are three *Doom*-related projects in the works now: *Doom II: Hell On Earth*, our retail sequel; *Druid*, a product by Raven Software [*Shadowcaster*, *Black Crypt*] which will be basically a fantasy version of *Doom*. And *Strife*, a cyberpunk roleplaying game by Cygnus Studios [*Raptor*], which should go some way to addressing all the people who want a more sophisticated game from us. Then it's on to *Quake*...

Edge How long did it take to produce the 3D code for *Wolfenstein 3D* and then for the enhanced engine used in *Doom*?

JC First of all, none of our game generations have ever shared any code. I take each new game as an opportunity to start from scratch, fully utilising all of the additional knowledge acquired in the previous project. *Wolfenstein* only took about a month to write the core engine. It took about three months to get *Doom* up and running, but later in the project I spent two more months rewriting the entire engine using a different central algorithm.

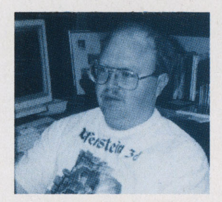
Edge What were the most difficult aspects of coding *Doom*?

JC Fast graphics rendering is always a challenge, but the game simulation environment was also quite difficult. Simple-sounding issues like line-of-sight determination become a lot more difficult as the environment gets more complex, and if you need to do thousands of them a second, the straightforward implementation doesn't really work out.

Edge *Doom*'s parallax scenery is particularly impressive: was this difficult to achieve?

JC If you mean the sky backdrop, it's pretty easy. A table is built whenever the screen is sized that has an angle offset for each column. This is added to the current view direction and mapped onto the rows of the sky picture. That row is then scaled onto the screen. *Doom* before v1.3 did have a slight bug in this that I just noticed a couple of weeks ago: when you size the screen down, the vertical scale isn't corrected, so the sky gets 'pinched'. This is now fixed.

Edge How do you think your 3D



Game designer Sandy Peterson models the latest in id peripherals

routines compare to games like *Ultima Underworld*?

JC We have different goals in mind, so we took different approaches. The *Underworld* games have the advantage of the ability to look up and down and model sloping surfaces. Disadvantages are in the limited view range, which prevents you from having huge areas, the overall game speed, and the fact that the game map is tile-based rather than geometry-based, which makes creating unique areas much more tedious.

Edge Do you think you can enhance *Doom*'s 3D engine?

JC I'm doing minor enhancements for the upcoming *Doom* products, but most of my engine attention is centred on *Quake*, which will be a totally new generation of code that bears no resemblance to the current stuff. It will be a full six degree of freedom engine with arbitrary modelling capabilities.

Edge *Doom* is an excellent example of the superiority of on-the-fly 3D games over FMV CD games. Do you agree?

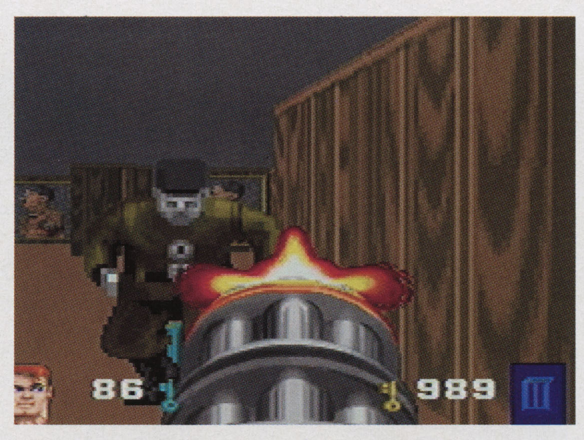
JC I want id to remain a champion of constant interaction games. We're for people who want to *do* something, rather than watch something. That market is there, but we want no part of it.

Edge What are your next projects after Jaguar *Doom*?

JC I'll be working on the next-generation game, for release next year. We might also port *Doom* to one of Sega's new systems.

Edge Any other formats?

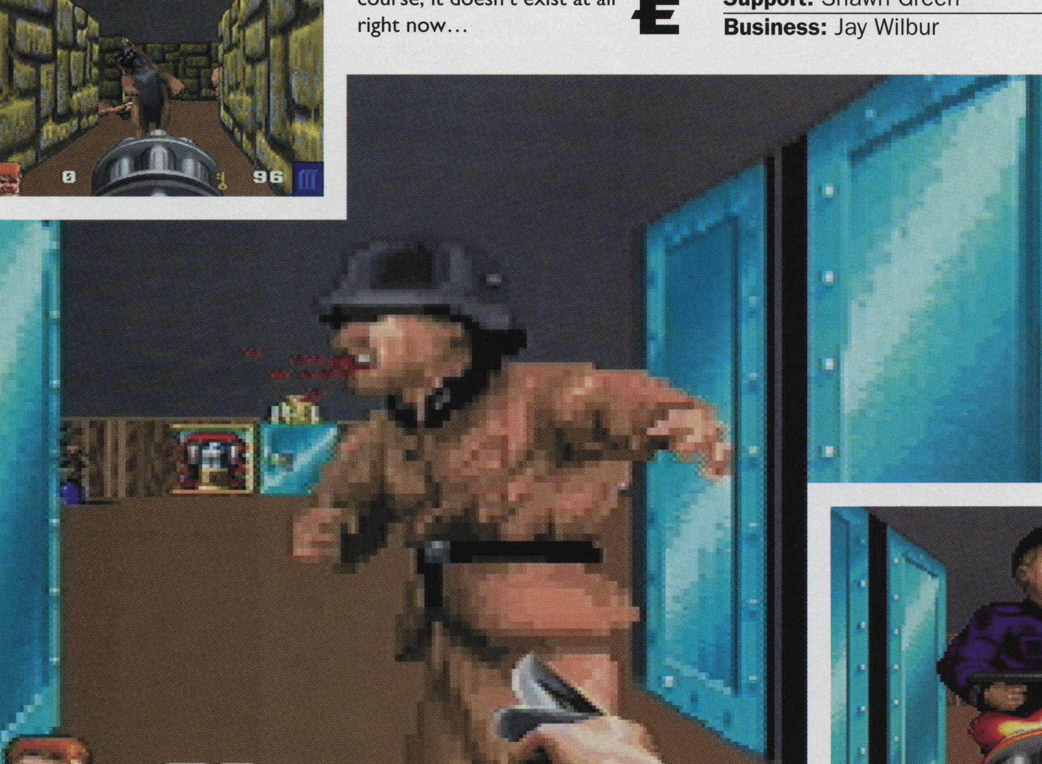
JC Well, Project Reality is very doubtful. We tried the compromise-our-games-to-please-Nintendo bit with SNES *Wolfenstein*, and we hated it. As long as Nintendo is going to play the prudish morality squad, I don't think you're going to see another id product on anything they make. I'd love to see the technical docs, though; I do expect it to be a killer system when it's released. Of course, it doesn't exist at all right now… **E**



***W3D* was on show at the ECTS, where Edge was impressed with its speed. But with Jaguar *Doom* in the pipeline, will it sell?**

Credits

Tech director: John Carmack
Programmer: David Taylor
Programmer: John Romero
Graphics: Adrian Carmack
Graphics: Kevin Cloud
Game design: Sandy Peterson
Music: Bobby Prince
Support: Shawn Green
Business: Jay Wilbur



***Wolfenstein 3D* on the Jaguar runs fullscreen, has four times the graphical detail and three times the sound rate of the PC version. And, unlike the perpetually squeamish Nintendo, Atari have no qualms about retaining the Nazi overtones and grisly portrayal of violence**

Theme Park






Some clips from *Theme Park*'s beautiful intro sequence – all designed and rendered on Silicon Graphics workstations, no less

Format:	**PC CD-ROM**
Publisher:	**Electronic Arts**
Developer:	**Bullfrog**
Release date:	**June**
Size:	**1 CD**
Origin:	**UK**

Ever wondered what it would be like to create and manage your very own theme park? Well, ponder no more, because thanks to Bullfrog you can now do just that.

Although the idea of running and managing a theme park is a novel one, the game is actually a straightforward business simulation, a genre which Bullfrog boss Peter Molyneux knows something about.

'One of the first games I ever wrote was a business simulator,' he says. 'Back in 1983, all a programmer had to do was write a simple shoot 'em up and they'd be a millionaire. But with my business acumen I decided to write a business simulator.' Needless to say, Peter's game didn't make him a millionaire – he only ever got two orders for his mail-order game...

But after the success of *Populous*, *Powermonger* and the recent smash hit, *Syndicate*, Peter believed that now was an appropriate time to pursue his original business simulator concept: 'Everyone who played my game liked it a lot, and so did I. So I hit upon the idea for *Theme Park*.'

The game puts you in the role of a nephew who's just inherited a fortune from his crazy aunt. But the aunt has included a clause in her will specifying that the money can only be spent on building the world's biggest and most profitable theme park.

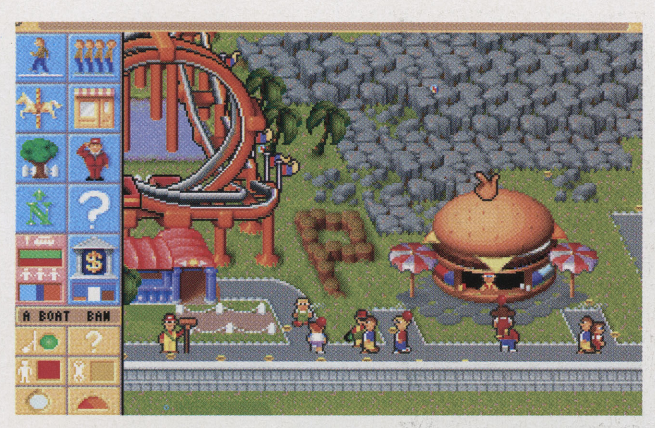
Theme Park offers a choice of three modes: Sand Box, Simulation

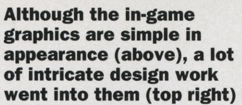


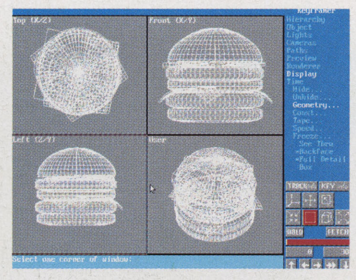
Helpful information pops up at the bottom of the screen throughout the game

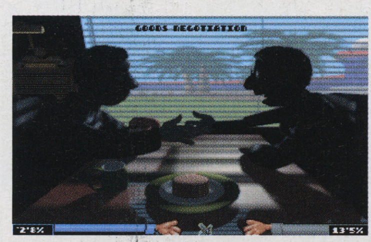


There are 32 purpose-built rides and six user-definable ones. The rides may look dull here, but you can make them more exciting by increasing their speed



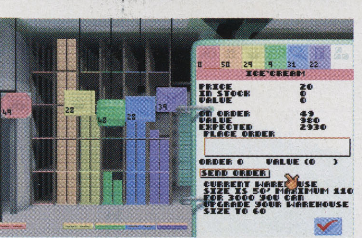

Although the in-game graphics are simple in appearance (above), a lot of intricate design work went into them (top right)







3D Studio played an important role in the production of *Theme Park*: everything in the game was drawn and modelled using the package. The Haunted House (right) began life as a computer model in *3D Studio* (left)



Negotiations must be made before the biscuits run out (top). Sales figures and an order form (above)

and Business Simulation. Both of the simulation modes challenge you to build and run a successful theme park, and require you to make all the necessary financial decisions. But Sand Box mode dispenses with these tiresome constraints and allows you to build the theme park of your dreams – all that matters is that the people who visit the park enjoy themselves.

Without doubt, one of the most striking features of *Theme Park* is its level of detail. Every business decision you make, no matter how trivial it may seem, has an effect on your park. And the people who visit it have an uncanny level of intelligence – far greater than their brethren in *Powermonger* or *Populous*. According to Peter, every person in the game takes up around 200 bytes of memory – enough to give each one a unique personality. For instance, the characters get hungry and thirsty at different times; they can even become happy or sad.

'By looking at the screen you can see what people think of your park,' explains Peter. 'If they're enjoying it, they'll be smiling and moving to the next ride. If they're sad, they won't go on the rides, and your park may fail.'

Whether Peter will be smiling when *Theme Park* is released on the PC in June remains to be seen. E

Credits

Programmer: Peter Molyneux
Programmer: Phil Harvey
Programmer: James Robertson
Programmer: Dennis Hassabis
Programmer: Mark Webley
Sound: Russell Shaw
Graphic artist: Chris Hill
Graphic artist: Fin McGechie
Graphic artist: Paul McLaughlin
Graphic artist: Mike Man

Every person in the game takes up around 200 bytes of memory – enough to give each one a unique personality

Flink

Mega Drive games have always come a poor second to SNES titles in terms of sheer prettiness. **Edge** looks at a brave attempt by Psygnosis to win the 16bit beauty contest



Flink can bounce on that springy leaf and soar high into the air (above)

Format:	Mega Drive
Publisher:	Psygnosis
Developer:	Interactive Design
Release date:	Unknown
Size:	16Mbits
Origin:	UK



A very big and nasty-looking creature (top) and a very small and nasty-looking creature (above)

Psygnosis claim that their latest game, currently in development, will have 'probably the best graphics on the Mega Drive'. A bold statement indeed, but after seeing an early version of *Flink*, **Edge** is almost inclined to agree.

Flink is yet another in a long line of platform games for the Mega Drive, but its graphics alone place it a notch above its rivals. Psygnosis are hoping that *Flink*'s impressive visuals, coupled

***Flink* is a genuinely wonderful-looking game, with detailed sprites and smooth animation**



Perched precariously on a platform, Flink tries to keep his balance

Levels in *Flink* have up to three layers of parallax (top). This chest (insert) contains spell ingredients. Flink uses clouds as platforms (above). The end of the level is across this bridge (above right). The spinning tomatoes from *Magical Quest* appear here too (below right)

with some innovative gameplay, will give the flagging platform genre a much-needed boost.

The plot goes something like this: the homeland of the game's hero, Flink, has been disrupted by an evil wizard who wants Flink's land for himself. The land's five leaders hear of his intentions, but before they have a chance to react, the wizard captures them and imprisons them inside huge crystals. It's your role, as Flink, to save the land by tackling the wizard and rescuing its five leaders.

Silly scenario aside, *Flink* is a genuinely wonderful-looking game, with detailed sprites and smooth animation. But it's the backgrounds that really make the game stand out: the use of colour is so exceptional you'd be forgiven for thinking this was a SNES game. But thankfully, unlike *Microcosm*, *Flink* is unlikely to suffer from the dreaded 'all style and no substance' syndrome: Psygnosis are promising some rather exciting gameplay features, as well as hidden levels, to keep gamers happy.

Using the now obligatory stomp-on-the-head attack, Flink can attack his foes and pick up various items throughout his 25-level journey. Special ingredients can be collected and mixed together to form spells, which can be used for a variety of purposes – defeating a boss or uncovering a secret level, for example.

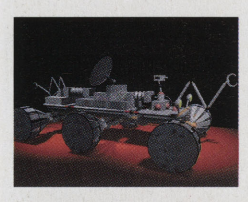
Even though it bears more than a passing resemblance to *Mickey's Magical Quest* on the SNES, *Flink* is sure to be warmly received by Mega Drive platform addicts. Whether it will have enough variety to stimulate the senses of other gamers remains to be seen. E

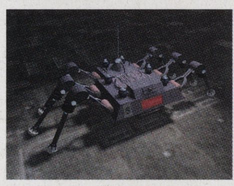
Credits

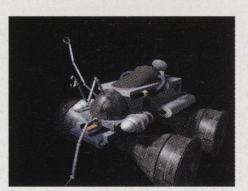
Programmer: Irwin Kloibhofer
Programmer: Henk Nieborg

Outpost

Sierra's space exploration saga blends down-to-Earth strategy with out-of-this-world graphics. **Edge** blasts off...



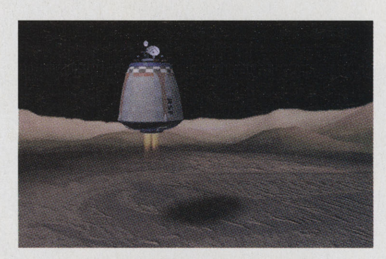


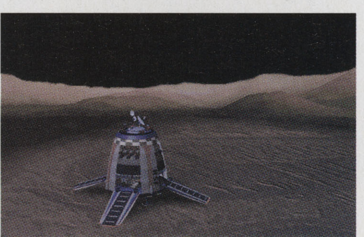


These Explorer robots (top and middle) investigate potentially hospitable planets. Repair robots (above) maintain equipment

Format:	**PC**
Publisher:	**Sierra**
Developer:	**In-house**
Release date:	**May**
Size:	**I CD**
Origin:	**US**

The Earth is constantly under attack in videogames. Usually the aggressors are huge crab-like creatures with nothing better to do than wreak havoc. But in *Outpost*, the greatest threat faced by the Earth is a mass of rock almost 15 miles in diameter, which is hurtling through space towards the planet. This asteroid is capable of puncturing the Earth's crust to a depth of 12 miles, leaving a crater over 100 miles in

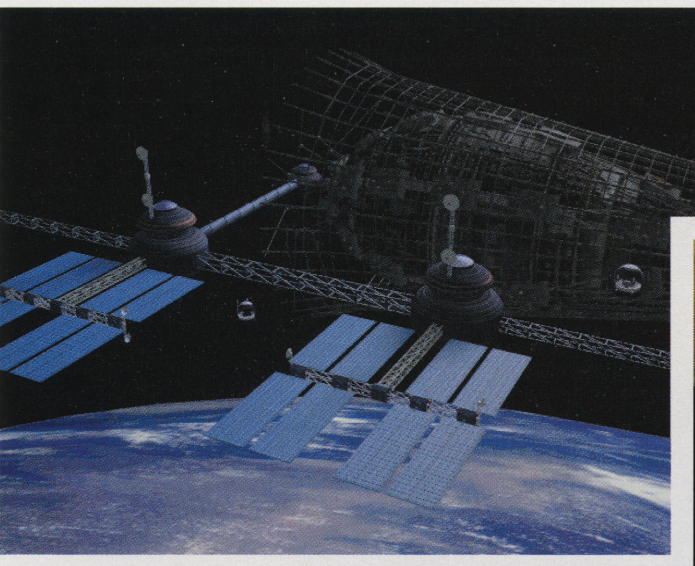


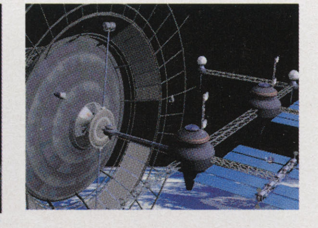


Your first supply pod – containing a seed factory – lands successfully

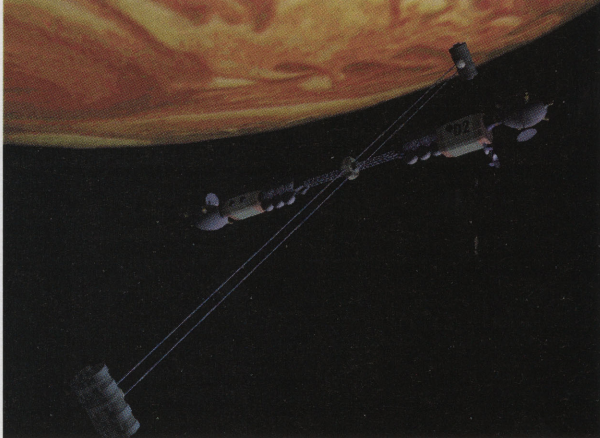


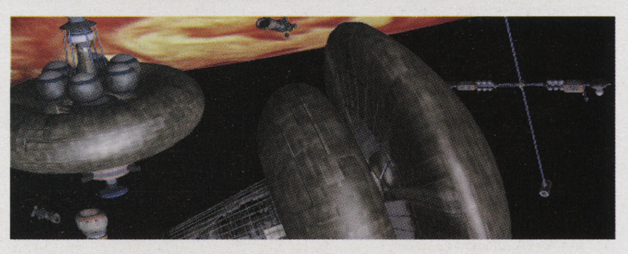
This is your space colony, which provides the setting for most of the action in *Outpost*. Before you can start construction, though, you have to scour the planet's surface to determine the most suitable location





The future of the Earth lies in the hands of the 200 select people in the as yet untested mothership (above). Without the help of this satellite (above right), your journey would be much more dangerous





One of the artificially intelligent space probes (middle) – based on real NASA technology. Before you leave the solar system, you have to stop at this huge petrol station (above) on Jupiter to fill up

What sets *Outpost* apart is its wealth of astonishing rendered animation – these give the game real atmosphere

circumference. In other words, some pretty heavy shit is coming down.

You're given the responsibility of saving the remnants of the human race from this impending catastrophe. As leader of the last human outpost on Earth, you have to send out probes to collect data on planets that could provide a base for a colony. While the probes are gathering this information, you have to start building and stocking a colonisation starship; when they return with the relevant details, it's time to launch your mothership on its interstellar voyage and set about re-establishing the human race.

On your arrival at your new home, you have to manage your colony like any growing city. This consists of building homes, keeping the 200-strong population employed and happy, exploring the environment and mining for resources. You can even develop multiple colonies and establish trading between them.

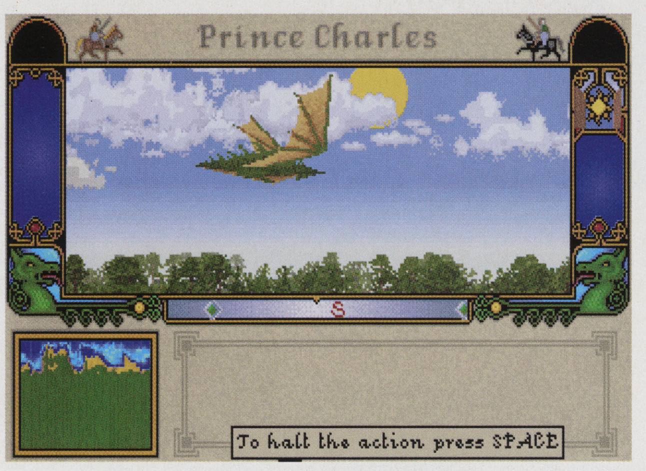
Outpost is the brainchild of American **Bruce Balfour**, lead designer and producer on many of Sierra's top games. He claims that a short stint at NASA helped him develop his idea: 'After getting a degree in computer science, I got into NASA. I started an internship, which later developed into a fulltime job as systems manager for the Space Projects Branch of the Space Sciences Division. While I was there, I did a lot of research into artificial intelligence. NASA then started to get interested in doing things like giving space probes enough intelligence so they wouldn't require as much control from Earth.' It's these artificially intelligent probes that appear in *Outpost*.

Bruce has also included many features of his own, ensuring an integration of gameplay and realism that enables *Outpost* to be played for fun or treated as a serious strategic simulation. Although it borrows ideas from games like *SimCity*, *Millennium 2.2* and *Deuteros* on the ST and Amiga, what sets *Outpost* apart from its predecessors is its wealth of astonishing rendered animation – these scenes give the game real atmosphere and are so impressive you won't tire of seeing them over and over again.

Outpost is one of the most impressive-looking PC games at the moment. Let's hope we see a few more games making use of the PC's glorious Super VGA mode.

Lords of Midnight III

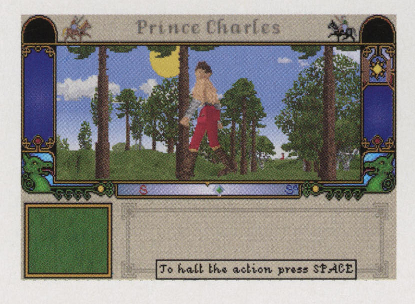
Prolific programmer Mike Singleton talks to **Edge** about the third game in his long-running adventure series



Hijacking a dragon enables you to cover greater distances. It also gives you a good chance to see the lovely 3D clouds from above

Format:	**PC**
Publisher:	**Domark**
Developer:	**Maelstrom**
Release date:	**Summer**
Size:	**TBA**
Origin:	**UK**

With a career stretching back 15 years – starting with the venerable Commodore PET – **Mike Singleton** has an impressive programming pedigree. Now he is returning to his roots to create a game he first planned nine years ago: *Lords Of Midnight III: The Citadel.*



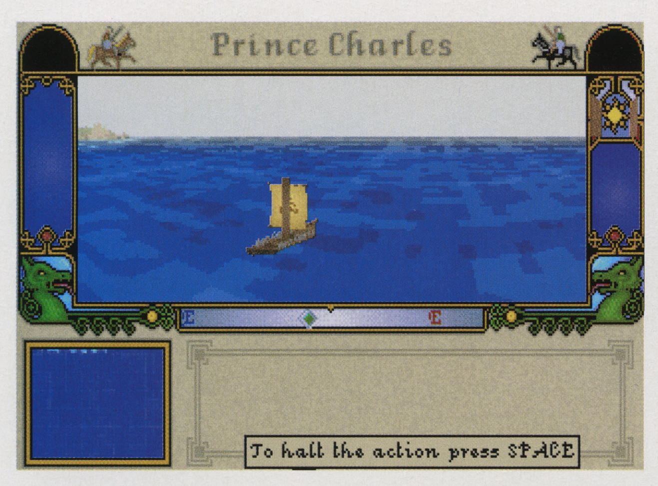
The game is a strategy-adventure set in a graphically detailed Tolkienesque world. In order to fulfil your goal of releasing Prince Luxor from the citadel where he has been imprisoned by Mad Boroth, you have to rally armies, engage in battles, meet people and carry out various quests.

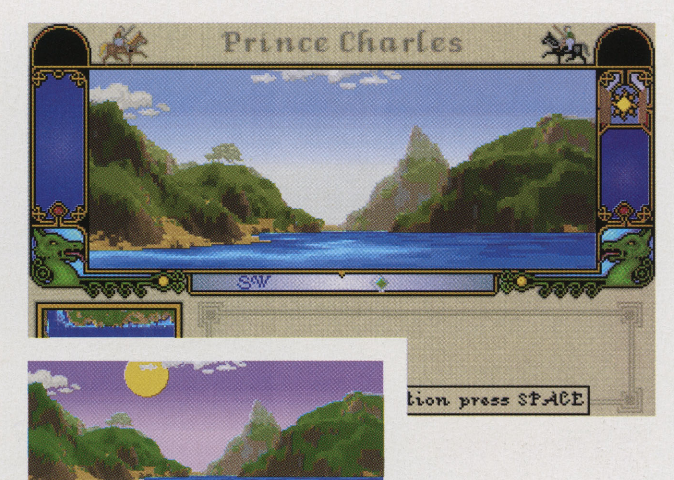
The 3D world, measuring 64,000x64,000 pixels, comprises a lush landscape full of forests, plateaux, lakes and mountains. To complete the game you have to explore every inch of it, discovering its hidden buildings,





Computer-controlled characters are used for the game's combat sequences. Here, a small group of fighters is marching to a battle

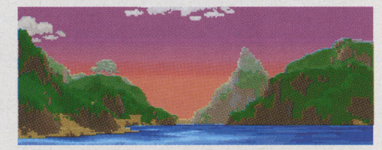


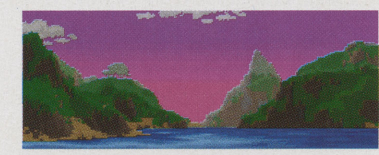


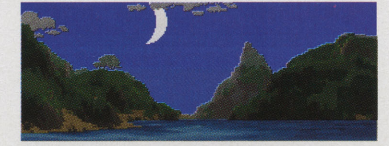


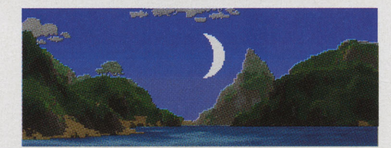
About 30% of the gameworld is water; these boats (above) enable you to travel from one land mass to another. This island (top right) is represented by just one of the 4 billion pixels on the game map











The realtime option makes time pass at the same rate as it does in the real world. Thus it takes several hours for day (top) to becomes night (bottom)

embarking on voyages and steering clear of the creatures that lurk in the darker regions of the realm.

The principal problem encountered by the team during development was storage of all the data involved. 'The actual gameworld is gigantic,' says Mike. 'I've tried walking from one side of the map to the other and it took me over an hour in realtime. And it's all fully raytraced. If you were to decompress the graphic data, you'd have about eight gigabytes. That kind of figure is obviously unworkable, so there's an awful lot of interpolation in the game: we can't expand the whole map at once, so you're obviously in a restricted viewing area when you're on the ground and as you move forward it's doing a rolling interpolation.'

The effect of this, says Mike, is that you never lose sight of the horizon and there's no pause while the computer generates the next portion of landscape – everything scrolls around exceptionally smoothly.

Mike was very keen to create his own virtual reality. For example, the game operates its own calendar year: it looks at your PC's system clock, works out what time it is, then calculates the height of the sun or the moon in the sky. The result of this is that you play in a completely realistic timeframe.

Mike Singleton
Game history

Space Ace
Commodore PET, 1979
Games Pack One
ZX81, 1981
Starlord (Play-by-mail)
1982
Castles
VIC20, 1983
Shadowfax
VIC20, 1983
Snakes
VIC20, 1983
3Deep Space
BBC Micro, 1984
Lords Of Midnight
Spectrum, 1985
Dark Sceptre
Spectrum, 1986
Whirligig
C64, 1986
Lords Of Midnight II: Doomdark's Revenge
C64, 1985
Star Trek
Atari ST, 1987
Midwinter
Atari ST, 1989
Midwinter II
Atari ST, 1990
Ashes Of Empire
Atari ST, 1991
Lords Of Midnight III
PC, 1994

Continued next page

prescreen

'The actual gameworld is gigantic. I've tried walking from one side of the map to the other, and it took me over an hour in realtime'



The map screen lets you plan your route for long journeys

The key to winning the game lies in recruiting armies (above). With only three soldiers (top), your rampaging horde is looking rather undermanned at the moment

Continued

Similarly, the landscape changes according to the seasons – play the game in February and you find snow and bare trees; try again in July and green trees and lush grass are in evidence. This 'real' realtime aspect continues even after you switch off the computer – boot the game up again after not playing for two weeks and you might find that your armies have lost faith in you and your allies have teamed up with someone else.

Although the combat sequences are viewed from the usual beat 'em up side-on position (the way in which the characters move is reminiscent of *Virtua Fighters*), Mike was at pains to prevent this aspect of the game resembling a standard beat 'em up: 'They're just too random. I didn't want a joystick waggler.'

In order to make the fighting as accurate as possible, Mike recruited an expert in real combat. Hence the secret to winning a fight lies in catching your opponent off balance rather than knowing which convoluted joypad sequence rips his spinal cord out. Defence is automatic; your only decision is the kind of attack you want to make from four basic moves.

To succeed in *Lords Of Midnight III*, you need to recruit people to follow you in your quest. Some join you immediately; some agree only after you've completed a task for them. To win characters over you have to talk to them, so your chosen line of dialogue determines how receptive they are to your plans. Once you've got their trust you can 'become' them by simply clicking on the appropriate image from an options screen.

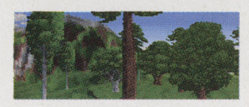
Lords Of Midnight III was programmed for the most part by just two people: Mike Singleton and Dave Ollman. This small-team approach seems to have paid off; from what **Edge** saw of the game, it's a darn sight more impressive than the clinical products offered by enormous groups of programmers, graphic designers, script authors and head gaffers. Home grown talent such as Maelstrom are becoming increasingly rare; considering the quality and originality of their games, this is a shame.

Lords Of Midnight III: The Citadel is slated for a summer release on PC. PC CD-ROM and Amiga versions may follow.

Credits

Game designer: Mike Singleton
Lead programmer: Dave Ollman
Graphic artist: Andy Elkerton
Solid graphics artist: Stuart Flint
Music: Paul Rowbotham



The seasons follow each other in ***Lords Of Midnight III*** just as you'd expect them to



Mike Singleton has been creating computer games since the days of the Commodore PET

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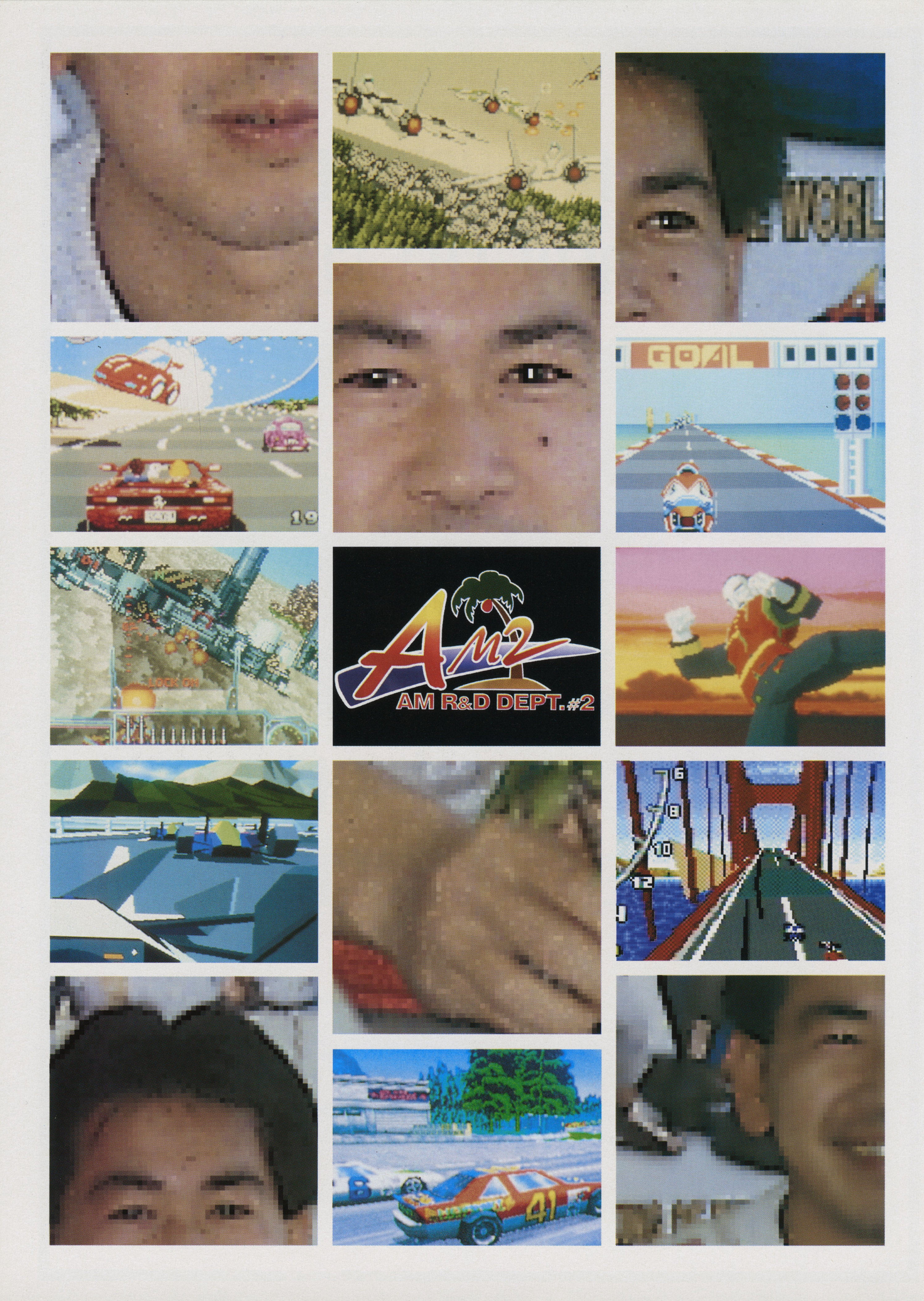
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GOAL
Am2
AM R&D DEPT.#2

鈴木 裕

Yu Suzuki: Sega's driving force


Sega's amusement division is located in Ohta-ku, Tokyo

Yu Suzuki is the legendary head of AM2, Sega's core coin-op R&D operation. **Edge** gained access to AM2's Tokyo base to meet the talent behind some of the greatest Sega coin-ops ever

Yu Suzuki is Sega's undisputed coin-op champion. Since joining the company 11 years ago, he has been the guiding force behind Sega's biggest coin-op successes. Some of the most influential games of the past decade, from early sprite scalers like *Hang On* and *Out Run* to the polygon-packed excesses of *Virtua Racing* and *Virtua Fighters*, have been produced under his auspices. His latest, and potentially greatest, creation is *Daytona GP*, a game that represents the apex of Sega's 3D polygon technology.

Edge was fortunate enough to be invited to Sega's amusement (coin-op) division to see the finished game in action and talk to Mr Suzuki.

Edge How many people work in AM2, and how is Sega's amusement division structured?


Yu Suzuki: his status as coin-op guru is unrivalled

Yu Suzuki Sega have around 600 people working in the amusement division and AM2 is just one part of that. Around 100 people collectively form what's now known as AM2. We're basically just a large team. Originally, there was only one department, but the advent of proper CG technology meant our resources had to be channelled in different directions.

Edge What other games has AM2 been responsible for?

Continued next page


16TH/16
TIME
6
LAP
SPEED
0Km/h


LAU
WIN
15"96
WIN
KAGE



YS *Virtua Racing* was the first game we produced, but after we finished that we split AM2 into two departments – one team worked on *Virtua Fighters* while the other concentrated on *Daytona GP*. Of course, there are many staff here, including myself, who have worked on a great many of Sega's other arcade games, and on Sega's arcade hardware, such as System 24 and 32.

Edge When you started at Sega, were you able to choose the department you worked in?
YS Yes, I'd say 80% of the people who work here get to choose the area they're interested in. When I started in 1983 there was only one division – the amusement [coin-op] division – so I didn't have to make a choice. In this division we've always been spoilt with big screens and high performance hardware – the games we design simply aren't restricted by hardware like they are in the home. I wouldn't want to give that up for the consumer [console] division.

Edge But AM2 recently converted *Virtua Racing* to the Mega Drive?
YS Yes, but mainly because the SVP chip meant it wasn't an over-complicated conversion. Without it, I don't think I would have even attempted it. Of course, with the introduction of Saturn and, in Europe, the Mega Drive 32, the crossover between the consumer and amusement divisions will be greater because the hardware is catching up with the technology we're using for the arcade.

Edge How many people did it take to produce the original *Virtua Racing* game?
YS Actually, it changed a lot. When we first started on the project we had about 10 people and by the end we had 25. I guess the average number was around 20 people working flat out for a year. That's just for the development of the actual game, though; the actual hardware – Model 1 – took longer.

Edge Model 1 was a big step forward at the time, wasn't it?
YS Yes, it took three years to develop, whereas new graphics hardware usually takes a period of about 12 months.

Edge So what's so special about the technology?
YS Well, when we first showed a prototype of *Virtua Racing*, most people thought it used parallel processing. They were surprised to find out that it's actually a sequential processing board.

Edge What kind of central processor does it use?
It's a 32bit RISC chip [the NEC V60] and at 16MHz it's actually pretty slow, executing just 2.5MIPS. Just one of the CPUs inside Saturn delivers 25MIPS!

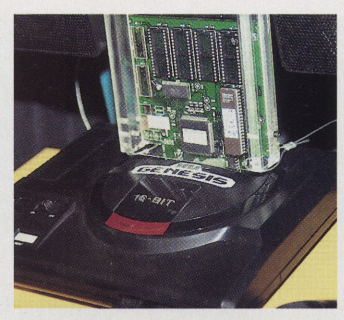
Edge How does Model 1 handle so much maths, then?
YS The graphics engine relies on high-speed digital signal processing, in a similar way to the Mega Drive cartridge, but on a much larger scale. There are four Fujitsu serial DSPs, as well as a high speed co-processor. There's also a processor for the background scrolling behind the polygons.

Edge You've restricted the Mega Drive game to just 16 colours. How many colours does the original game display?
YS The game runs in 24bit colour [16.7 million], with 16bit-colour [32,000] backgrounds. There's also an 8bit Alpha channel. The biggest difference is probably the resolution of the vectors: Model 1 and 2 were designed for a high screen resolution of 496x384 – almost twice the Mega Drive's.

Edge What about the polygon count. How does it compare to the Mega Drive version?
YS Model 1 was designed to calculate 180,000 a second, whereas the Mega Drive copes with between 3,000-5,000! In the coin-op version of *Virtua Racing*, the speed rarely drops below 30 frames per second. That means there are about 6,000 polygons every frame, compared to the 300-500 per frame on the Mega Drive, which runs at under half that – about 12-15fps.

'Cars have always been a big hobby of mine, and I've just been lucky that racing games are always in vogue'





Sega's SVP chip, as used in *Virtua Racing* on the Mega Drive

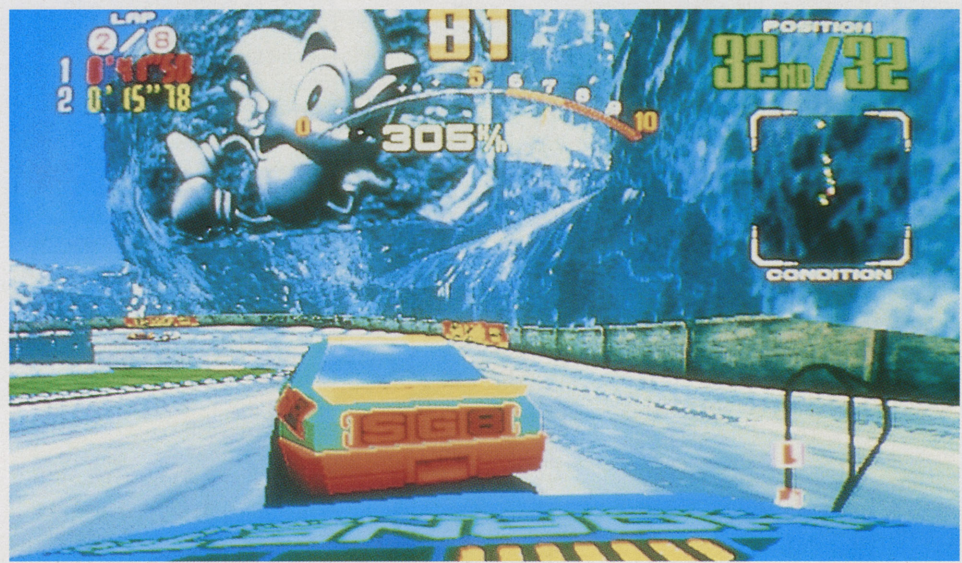
Edge What software was used to model the 3D polygons in *Virtua Racing* and *Virtua Fighters*?
YS We're pretty familiar with SoftImage's packages for Silicon Graphics, and their modelling software was used for the polygons in both games. We've also used SoftImage's *Flock Of Birds* motion capture system for the animation in *Virtua Fighters*.

Edge We've noticed that the graphics in *Virtua Fighters* seem less detailed than those in *Virtua Racing*, particularly the backgrounds. Doesn't the game use the same CG board – Model 1?
YS Yes it does, but we doubled the frame rate in *Virtua Fighters* because fighting games require a faster response.
[Twice the frame rate means half the number of polygons that can be displayed simultaneously.]

Edge You've produced a lot of racing games. Why is that?
YS Cars have always been a big hobby of mine, and I suppose I'm just lucky that racing games always seem to be in vogue. For *Virtua Racing* I did some research into the 1992 Ferrari and MacLaren-Honda engines, and spoke to drivers and engineers, as well as hiring a Honda NSX for a period. The finished game includes around 120 parameters, including air density, slipstreams, aerodynamics, etc, of which I'd say around 20-30 really matter. I like the way racing games can throw the body around too, such as the deluxe versions of *Daytona* and *Virtua Racing*.

Continued next page









***Daytona GP* (left and above), Sega's first phase of texture-mapped 3D. The finished game was unveiled at the Japanese AOU show**

Model 2 tech specs

CPU: 32bit RISC @ 25MHz

Co-processors: 32bit @ 16 MFLOPS
3D matrix

Memory: 8Mbits RAM
Up to 248Mbits ROM
(*Daytona* uses 178Mbits of ROM)

3D graphics engine:
900,000 vectors/sec
300,000 polygons/sec
Features:
Flat shading
Texture mapping
Micro-texture
Multi-window
Spread reflection mode
Mirror reflection mode

Polygons: 120 million pixels/sec
65,536 colours
(1024-colour palette)

Screen: 496x384
Medium resolution
Horizontal frequency 24MHz

Scrolling: Two planes
32,768 colours
(128-colour palette)

Windows: Two windows
32,768 colours
(128-colour palette)

Sound: MIDI compatible

Yu Suzuki

Name: Yu Suzuki
Date of birth: October 6, 1958
Nationality: Japanese
Blood group: A
Position: General Manager, Amusement R&D Department 2, Sega Enterprises
Started: April 1, 1983



Game history

Hang On (July 1985) This was the first in a series of great motorbike racing games from Sega. Its follow-up, *Super Hang On*, proved even more popular.

Space Alien (December 1985) Or *Space Harrier*, as it was known in the UK. This was an impressive display of Sega's sprite-scaling technology.

Out Run (September 1986) One of the most playable racing games ever created. With unlimited (for the time) visual appeal, *Out Run* ran and ran.

After Burner (July 1987) Although nowhere near as playable as *Out Run*, *After Burner* nevertheless became a coin-spinner of immense proportions.

Power Drift (August 1988) Advanced sprite scaling and an axis of rotation were the hallmarks of Sega's next level of racing performance.

G-LOC (May 1990) A mixture of sprite scaling and 3D polygons. Although a superior game to *After Burner*, it was, ironically, not as successful.

R-360 (November 1990) Take *G-Loc*, throw it inside a huge dedicated 360-degree rotating cabinet, and you get *R-360*. An amazing experience.

Virtua Racing (1992) The first game to use Sega's Model 1 board, *Virtua Racing* is one of the most exhilarating arcade racers ever designed. Fast and frenetic – a benchmark polygon shifter.

Virtua Fighters (December 1993) Using the same technology found in *Virtua Racing*, this one-on-one fighting game is technically outstanding.

Daytona GP (April 1994) Sega's latest and greatest racer. Unbelievable attention to detail and some of the most impressive texture-mapped polygons yet.

'I'm not keen on *Mortal Kombat 2*... I think it would have been a bigger hit if it hadn't been so violent'



Edge What about *Daytona*? Did a lot of research go into that as well?

YS Similarly, I've been racing regularly at the *Daytona* track in Florida and gathering useful information. I'm going there on Sunday, as a matter of fact. On business, of course!

Edge How many units can be connected together in the finished version of *Daytona*?

YS Originally, I had wanted to have 40 cars linked up, just like in a real race, but it just wasn't feasible. In the end eight cars can be linked up.

Edge And the Model 2 hardware? How did that evolve?

YS General Electric Co. approached us because they had realtime texture-mapping ASICs [application-specific integrated circuits] and we entered a commercial partnership with them in August 1992. We co-developed the Model 2 board with them over a period of a year, and *Daytona GP* took a further year to develop. [This division of General Electric has now been bought by Martin Marietta Corp.]

Edge What advantages does Model 2 offer over Model 1?

YS Well, there's obviously the texture mapping, and there are almost twice as many polygons – 300,000. But there are also special effects like the reflection of the sky in the windows of the cars – that's all handled in hardware by separate algorithms.

Edge What about graphic techniques like Gouraud shading?

YS *Daytona* only uses Gouraud shading in the attract sequence – the actual game uses flat shading, which is much faster and I think gives a good enough impression. I'm pretty sure *Ridge Racer* has been programmed in the same way – if the game used Gouraud shading throughout I think it would be between three and five times slower.

Edge So do you think Model 2

Continued next page

Sega feature



Edge beats Namco's System 22?
YS Personally, yes. I think the driving sensation in both games is similar, but I think our graphics engine offers slightly more performance. *Ridge Racer* is a great game, but I think it would have been better if I'd handled the project myself!

Edge Do your staff enjoy playing games themselves?
YS Usually, yes, but speaking personally I prefer to find more interesting things to do than playing games – such as racing cars and eating French food.

Edge Do you like any non-Sega coin-ops?
YS Oh yes. *Ridge Racer* is my personal favourite, if only because of its computer graphics, but I also like some of the SNK fighting games – such as *Fatal Fury 2* and *Samurai Shodown*. Generally speaking, the quality of coin-ops tends to be much higher than consumer games. I'm not keen on *Mortal Kombat 2* – it's too violent and bloody for young children. I think it would have been a bigger hit if it hadn't been as violent.

Edge What are your personal Sega favourites?
YS I'm still quite fond of *Out Run*, which was a big hit in 1987 – this was the first game to use the Super Scaler technology. I think the impact this technology made at the time has now been repeated with *Virtua Racing* and *Daytona GP*.

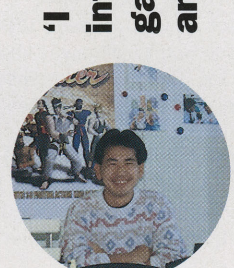
Edge So you think technical innovations are just as important as gameplay?
YS I'm very keen on the technological impact a game has, but ultimately the success of a game rests on how much fun it is to play.

Edge What do you think the future holds for coin-op games?
YS Virtual reality and computer graphics currently represent about 30 per cent of the coin-op market, and that's a large proportion. When hardware costs eventually come down, 3D will start to make greater inroads into the market.

Edge What are Sega's plans for virtual reality?
YS The most difficult aspect of virtual reality is the cost of production, and making hardware that's durable enough for home and arcade use. In general, there are three main problems with current virtual reality technology: sensors, image generation, and projection technology. Of course, Sega have no problems with image generation, and we're doing research into the other two areas now, with the help of Virtuality in the UK.

Edge Where do you see the coin-op market going?
YS At the moment it's growing again – there are good opportunities for us in Asia and South America. As for the USA and Europe, the market isn't as saturated there as many people are suggesting. Coin-ops will continue to deliver high technology but I think the market is getting increasingly family orientated. Sega are reacting to this with small family 'Disneylands' offering games for all the family, and VRcades.

'I prefer to do more interesting things than play games – such as racing cars and eating French food'



Edge Tell us about Titan…
YS Titan is a new arcade board that's very similar to Saturn, only with a bigger memory and a good serial I/O. The sound is different – it's got a custom sound board – and the hardware's been speeded up for greater performance.

Edge So Titan is more powerful than Saturn? Is it also more powerful than Model 2?
YS Yes, the system's more powerful than Saturn, but the performance isn't comparable to Model 2. Model 2 is a pure 3D graphics engine with very high-technology hardware, and is naturally more expensive than Titan. Also, Titan is based on 2D-technology hardware.
[One of Saturn's first action games will have a 2D polygon-based environment.]

Edge How many more Model 1 and 2 games can we expect to see in the near future?
YS I'm not sure. We have a couple of Model 1 games in the pipeline, although it's possible they'll get ported up to the superior hardware. At the moment we're working on a 3D tank simulation with Martin Marrieta of General Electric.

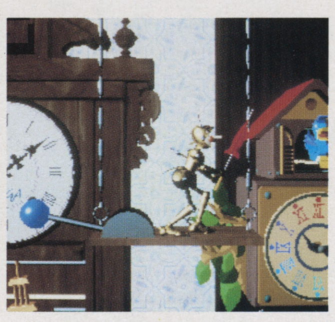
Edge And what about other new hardware in the offing?
YS We have about five or six hardware projects in development at the moment, but the only one I can mention is Model 3. Compared to Model 2, this is a very high-performance board. Many people will be surprised at the performance!

Although the success of *Daytona GP* looks assured, it is evident that Yu Suzuki's team will not be resting on their laurels. With the successor to Model 2 apparently in the development, as well as other mysterious projects, AM2 is already moving on to bigger things.

(Thanks to Hibi Misao for co-ordinating this interview.)



This is the powerhouse where Sega's coin-ops are conceived



One of the first Saturn games uses polygons for its 3D backgrounds



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Illustration: **Kath McCloskie**

Global **dominat**



Nintendo and Sega have had it all their own way so far. But now the big boys are moving in on the interactive entertainment industry. **Edge** investigates the companies with their eyes on the multimedia prize

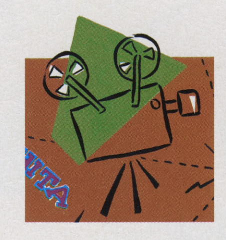
ion

The American novelist Kurt Vonnegut saw it all years ago. In his novel, Hocus Pocus, the hero, Eugene, goes to work at a prison in the American midwest. The prison is run for profit by a huge Japanese company, with the guards young Japanese men. And which multinational company did Vonnegut cast as global dominators? Sony.

Okay, no-one's suggesting that Sony are seriously considering buying up the world's prisons to increase

Continued next page

global domination



profits, but recent developments indicate that the $34 billion-a-year corporation is eyeing the world's entertainment and media markets like you might look at your shopping list.

The PlayStation-X CD console, planned for November 1994, is just the tip of the iceberg as far as Sony multimedia is concerned, but it shows clearly that the company isn't going to sit back while others take over. And even giants like Nintendo start looking like minnows next to Sony.

The media world has already seen how Sony work when they get in the mood for a spot of expansion. Sony set their sights on the film industry during the 1980s, and during that decade came to Hollywood and treated it as a pick 'n' mix counter. They now own two major studios, Columbia and Tri Star, which form part of the Sony Pictures Entertainment division. In 1992, SPE were the movie industry's number one players for the second year in a row, taking more than 20 per cent of the total market. They notched up three $100 million plus films: Basic Instinct, A League Of Their Own and Dracula. A new division called Sony Pictures Classics, devoted to more highbrow product, has also been set up, and scored a direct hit first time out with Howard's End. This year they are almost certain to win big with titles such as Striking Distance, Wolf and Geronimo.

Within only ten years, Sony have become the biggest and most influential company in Hollywood.



But they haven't been content to stop there: Sony have approached the music market in the same way – with a blank cheque. In 1988 they acquired CBS records and its affiliated labels; last year two of their labels, Columbia and Epic, were the top two pop producers in the US Billboard charts.

And now the firm have turned their attention to the videogames market. They have already snapped up UK developer and publisher Psygnosis as part of their burgeoning Sony Electronic Publishing division. Since then they have also announced the formation of Sony Computer Entertainment – a new subsidiary whose intention is to produce new interactive hardware and software for use in the home.

The announcement of intent was lacking in detail, but it did confirm what many people believed all along; that Sony are not going to sit back and let the interactive entertainment market pass them by, and that they intend to challenge Sega, Nintendo, 3DO and anyone else in the battle to impose some sort of worldwide standard.

But SEP and the newly formed SCE are just a part of the Sony empire, and every far-flung corner of that empire will be used in the fight to establish a Sony multimedia format in what all industry analysts are predicting will be a multibillion-dollar industry within ten years.

Who knows – perhaps Kurt Vonnegut was on to something after all.

The rationale behind this global expansion is nothing new. The big electronics manufacturers, mostly Japanese, have long realised that they could make much, much more money if they controlled software as well as hardware in their various consumer electronics markets. In many ways, this is an emulation of the model created by Nintendo – the big 'N' have always seen hardware as simply a low-profit method of building up a large userbase to which software could be sold.

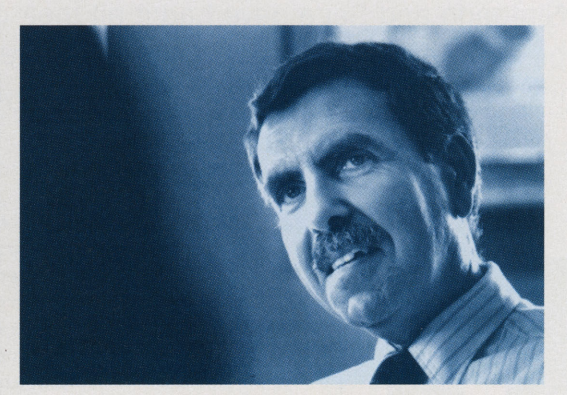
Now, for example, Sony don't just want to sell CD players; they want to sell the music played on them. They don't just want to sell TVs; they want to produce the programmes watched on them. They don't just want to sell videos; they want to make the films that run on them.

It's all about controlling as many of the elements of entertainment as possible (that also includes their creation and their distribution by media like cable or satellite). The more one group can provide for itself via its myriad divisions, the less it has to buy in and the more profit it makes.

Add to this the fact that previously distinct markets such as games, films, TV, music, theme parks, cable, satellite, etc are all converging to form competing power bases, as the giants of electronics and entertainment try to create the perfect mix for the perfect form of interactive entertainment.

And all these multibillion dollar industries are heading in the same direction – towards the one box under the telly that will





Sony, founded by Masaru Ibuka (top left), are now a huge concern: Sony Electronic Publishing – CEO Olaf Olafsson (left) – is just one of its many arms. Time Warner, headed by Gerald M Lewis (above), are leaner but just as hungry

do it all: play games, films and music videos as well as audio recordings, link with other users and databases – basically act as the focal point for a whole family's entertainment needs. Such a machine isn't actually on the market yet, but the concept is drawing everyone together, sucking them all in through the same loader and into the same machine, making mergers and acquisitions along the way inevitable.

Just when you think you've got everything mapped out, you realise that there are even bigger fish than Sony in the sea, whose global profiles may be smaller but whose pockets are way, way deeper. Take the enigmatic Matsushita, for example.

Matsushita manage to make Sony look small. They are the largest electronics manufacturers in the world and increasingly major players in all aspects of the entertainment industry. The company's turnover for the year ending March 31, 1993 was $60,826,000,000 – not far short of twice Sony's.

Matsushita's bid to control the world's entertainment industry is still relatively new. In the multimedia field, they are investors in 3DO and are the company's first hardware licensees, with their Panasonic FZ-1 Interactive Multiplayer becoming the first 3DO machine to retail following its launch in the States in October – Panasonic is Matsushita's leading brand in the electronic goods market. The firm also owns Victor Company Of Japan, which sells products under the JVC brand. So a JVC-badged 3DO player also looks like a distinct possibility.

Away from their core electronics business, Matsushita's other interests are huge. Through their acquisition of American entertainment giant MCA, Matsushita now own one of the major Hollywood studios, Universal. And in 1992 they did surprisingly good box office with a small arthouse movie called Jurassic Park. There is already a division called Universal Interactive Studios which is currently working on a 3DO version of Jurassic Park, and some pundits are predicting that the firm will break those still fresh JP box office records when The Flintstones is released this summer.

And earlier in the year Matsushita bought right into the heart of interactive entertainment with an investment in US publishers Interplay. They don't have a controlling stake in the firm, but they will treat their new partner as part of the family. Interplay's managing director, **Brian Fargo**, has already said that he will now 'get to run around under the MCA/Universal umbrella and pick at whatever I want'.

So as Matsushita get more involved in the interactive entertainment field, they will increasingly use their film studio to improve the quality of their games. It's something of a licence factory, but it means that when Jurassic Park 2 is being made, Matsushita will bring the interactive version of the movie into the equation at the earliest possible stage.

And access to footage, to stars and to sets will be guaranteed, as the firm strive to make their 3DO (or whatever) game as good as possible, so that 3DO becomes an increasingly attractive hardware proposition and a more likely candidate to provide a global interactive entertainment standard. MCA/Universal have already contributed portions of their films to the 3DO Contents Library, a facility that is free to all 3DO licensees. Also, when 3DO comes with built-in MPEG FMV, and looks towards taking a slice of the home video market, the Universal library will, it can be assumed, be made available.

In total, Matsushita's entertainment division (encompassing films, TV and music) achieved a whopping turnover of $5,240,052,000 last year. Not bad for a new kid on the block.

Sony are eyeing the world's entertainment and media markets like you might look at your shopping list

The Euro pretenders to the global entertainment throne, Philips, are a formidable force, but they haven't yet shown their best form in the interactive entertainment market.

Based in Eindhoven, Holland, Philips have their roots in electronics manufacturing and marketing but are branching into broader entertainment markets. Their turnover in 1992 was around $30,000,000,000, although this was largely made up of sales of their lightbulbs.

Philips' most high-profile attempt to break into interactive entertainment is Compact Disc Interactive (CD-i). The machine has never really taken off with the consumer or the traditional games market, however, and still has little in the way of quality software support. But Philips are not giving up. They might secretly acknowledge that CD-i is never going to be a true mass-market proposition, but perhaps some sort of Son Of CD-i could be. Philips had a major hand in the creation of the VHS and audio CD standards and believe they have a similar role to play in interactive CD.

It is also significant that Philips own 35 per cent of a division of Matsushita, called the Matsushita Electronics Corporation, which indicates that there is a relationship between the firms. Matsushita were one of the co-developers of CD-i – a machine which is now, ironically, in direct competition with the 3DO system they are also backing.

Philips and Matsushita are also in league against Sony in the next-generation digital audio wars: Digital Compact Cassette (DCC) vs Mini Disc. Both sides claim to have the format to replace CD – although just who asked them to replace CD remains a mystery...

The other big player on the field is Time Warner. With turnover of a touch over $13 billion, the US champs are gargantuan, but they're minnows compared to the mighty Japanese conglomerates.

Like Matsushita, Time Warner are 3DO investors, but their interest in the games market doesn't end there. They have a 25 per cent stake in Atari – and may yet throw their weight behind the

Continued next page

global **domination**



Matsushita's HQ in Osaka, Japan. With brands like Panasonic, National and JVC to their name, Matsushita are the world's biggest consumer electronics company

Continued



Jaguar – and also own Atari Games (known as Tengen). And they have joined forces with TeleCommunications Inc and Sega to launch a new US cable channel dedicated to piping videogames directly into homes in a pay-as-you-play scheme. There is also the rather low-key Time Warner Interactive Group, which until now has concentrated on 'infotainment' products for the Mac and PC markets. In fact, without being directly involved (through outright ownership or control) in the interactive entertainment field, Time Warner have still managed to work their way into a very powerful strategic position.

And their other interests shouldn't be overlooked, either. Through their Warner Bros subsidiary, Time Warner control the single most successful studio in Hollywood (Sony's 20 per cent, remember, is made up of two studios). In 1992 they had a bonanza year with hits such as Batman Returns, The Bodyguard, Lethal Weapon 3 and the Oscar-winning Unforgiven. In 1993 they had success with Falling Down, The Fugitive and Demolition Man.

1994 has started well with The Pelican Brief, and the studio will be hoping that films such as The Client (Susan Sarandon), Interview With A Vampire (Tom Cruise) and The Specialist (Sly Stallone, Sharon Stone) hit box office paydirt.

Warner Bros' strength is the relationships they have cultivated with Hollywood's hottest talent: artists such as Kevin Costner, Clint Eastwood and Joel Silver and production companies like New Regency and Morgan Creek. They own a library of over 2,200 feature films plus 1,500 animated features, and control the rights to perennial favourites like the Looney Tunes characters, Bugs Bunny, Daffy Duck and Tweety Bird. It's a formidable catalogue and one that could prove invaluable either in the creation of original interactive products or in access to a fantastic film library for 3DO owners. Having Time Warner on the team is certainly a massive plus point for 3DO.

But it doesn't end there. Warner Bros Television and its wholly owned subsidiary, Lorimar Television, are, between them, the largest suppliers of entertainment programmes to the US networks. And Time Warner's various music labels (over 40) are a significant force. Together they created a turnover of $3,214,000,000 in 1992. And yet another unrivalled weapon in the Time Warner armoury is their unique position in the global print publishing market: their magazines and books achieved a turnover of $3,123,000,000 in 1992.

Time Warner are one of the biggest suppliers of cable systems and cable programming in the world. Their strength is compounded by the fact that they are a carrier as well as a creator of programmes. Time Warner Cable has already purchased American Television and Communications (ATC) and there are now 7.1 million homes fed by Time Warner Cable.

The group's cable programmes have achieved even greater success. Time Warner own the well-established Home Box Office (HBO) network, which boasts around 20 million subscribers. As well as the hugely popular HBO movie channel, the network also offers sports and comedy channels. Time Warner have already linked up with Tele-Communications Inc and Sega with the intention of establishing a videogame cable channel in the US, but have also said that they are interested in making their cable power available for 3DO.

So despite being much smaller than either Sony or Matsushita, Time Warner are remarkably well-positioned in all corners of the entertainment world. Some of the shortfall in their turnover compared to their rivals can be ascribed to the fact that there is no electronics manufacturing business at the company's core.

And Time Warner's position begins to look even better when you learn that they own a 20.6 per cent stake in a small firm called Turner Broadcasting...

Turner Broadcasting, owned by erstwhile MGM president Ted Turner, are now a very big deal indeed in Hollywood and in US television. Earlier this year Turner snapped up two leading independent production companies, New Line and Castle Rock, paying out a total of $657,000,000. New Line enjoyed their finest hour in the '80s with the production of the Teenage Turtles films and the Nightmare On Elm Street series. Castle Rock are the playground of Spinal Tap director Rob Reiner. In recent years they have been the creative force behind some of Sony's biggest hits such as A Few Good Men and In The Line Of Fire. Turner also owns the cable networks CNN, WTBS and TNT, and is now definitely a contestant in the multimedia wars.

Turner Broadcasting Systems have heavyweight investors (Time Warner and Tele-Communications), but they are also a force to be reckoned with in their own right. So far the firm doesn't have any particularly direct links to the interactive entertainment market, but Turner is very much the media mogul and will be aware of every cross-format opportunity.

Viacom and TeleCommunications are the last of the really big multimedia rivals. Viacom are an incredibly successful TV production and distribution company. They also own and operate MTV, MTV Europe and the new children's channel, Nickelodeon, and have just bought the last independent film studio in Hollywood, Paramount Pictures.

Within Paramount there is a division called Paramount Technology Group which, like the Time Warner Interactive Group, has until now concentrated on infotainment. That is set to change: the division has invested in US software house Spectrum Holobyte, which is working on a new series of games based on Paramount's Star Trek films

And lastly, there's TeleCommunications Inc – the biggest cable television company in the world, which has just merged with US phone company Atlantic Bell. Together, the two companies now form a $60 million dollar behemoth with wires entering a third of all American homes.

TCI are not just a carrier of programmes but also a producer. Their Liberty Media division has a stake in a number of big cable channels, including one third of QVC, the home shopping channel. TCI recently announced a link-up with business software giant Microsoft; between them, the two are looking to introduce an interactive TV channel over the next two years, with tests due to start this summer. It isn't clear what services the new channel will provide, but games will surely play a part.

Back in Blighty, good ol' BT are finally out of the blocks, and if not exactly motoring down the fast lane of the infobahn then certainly picking up speed on the slip road. The firm has already set up a Video On Demand test in Ipswich and recently announced that they envisage an offshoot called Games On Demand to be fully operational within five years. Discussions have taken place with Sega and Nintendo about providing titles for the service and both firms are reportedly enthusiastic.

Other carriers looking to widen their empires include AT&T, also 3DO investors, and Nynex, the parent company of New York Telephone Company, which has a stake in Viacom, and therefore Paramount. Nynex are also said to be considering an audacious bid for the entire Time Warner empire.

And that's pretty much where it ends – for the minute, at least. Needless to say, there are other names on the horizon – like Rupert Murdoch's business empire, which includes Sky television, the main carrier and creator of satellite programming in Europe.

Matsushita manage to make Sony look small: their turnover for the year ending March 1993 was $60,826,000,000

The man from Down Under is also putting the wind up the major US TV networks with the success of Fox Broadcasting, fuelled by the worldwide phenomenon that is The Simpsons. Murdoch also owns the 20th Century Fox film studio and earlier this year the firm's licensing and merchandising president, Al Ovadia, revealed plans to launch a Fox games label. And remember, Murdoch is currently in talks with Sega about setting up a satellite channel in Europe along the lines of the proposed US cable channel.

But what about those big companies who have traditionally dominated the videogames industry, Sega and Nintendo? Neither firm has ever headed down the acquisition trail, and while they are now both making moves in the satellite and cable markets, they're both dwarfed by the vast multimedia interests of the multinationals currently converging on the interactive entertainment market. They may have given the market its original kickstart, but in an industry continually leaping forwards, loyalty to outdated brands can't be counted on.

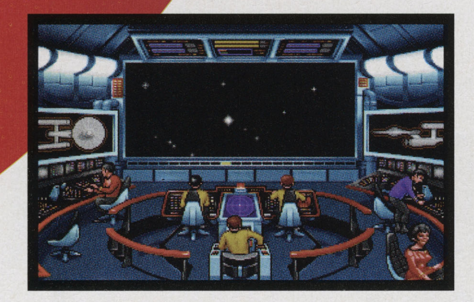


3DO's HQ in San Mateo, California, where Trip Hawkins launched his multimedia console. Without the giant Matsushita onboard, it may never have got off the ground

But of course, there's an upside to all this for the consumer: the first stage of the war for control of the market will be a hardware battle – we can expect prices of high-power, high-specced systems to plummet as the big names compete for a dominant share of this fledgling industry.

After all – and don't ever forget it – it's you, the consumer, who really decides which system takes off. And even the might of a Sony or a Matsushita is nothing compared to the power of the public to buy or not to buy…

Here's just three examples of what you'll find on our first amazing disc...



Great game demos - Mac owners will be absorbed by the astonishing Myst from Electronic Arts, while PC people will be engrossed in the new Star Trek, featuring dialogue from the Trek actors!



Videos - Famous Faces from Jasmin Multimedia would normally cost £70 for 100 royalty-free QuickTime or Video for Windows video clips, but we're giving you 20 of them entirely for free! Oh, plus we're including run-time versions of both Apple's QuickTime and Microsoft's Video for Windows for you to use. And if you can recognise the famous faces, you could win a video camcorder!



Multimedia do-it-yourself - Authorware from Macromind would normally cost a mind-bending £4,000, but we're giving you a special version which is fully functional up to a 50-operation limit. We'll also give you all the materials and all the know-how you need to try your hand at creating you own multimedia presentations. You'll be surprised how easy it is, and you could find it very useful.



There's a lot more on the disc too, including our unique interactive reviews - but we'll leave you to discover all that when you buy the magazine!



And this is our magazine. We'd like to help you explore the amazing new world of CD-ROM for the Mac and PC.

You'll find it in the shops from Thursday March 31st – the day before Easter weekend. So we'll see you then!

This swirling chrome object was modelled and rendered entirely in *3D Studio* on a PC. All this, and more, could be yours...

Win 3D Studio

Autodesk are rightly proud of their rendering package for the PC. And they would like one lucky reader of **Edge** to sample their wares.

They have kindly donated one whole copy of **3D Studio** worth a piddling £2,500. We did suggest giving ten away, but Autodesk declined. For some reason.

To win the current state of the art in PC rendering software, answer the questions below, write your answers on the back of a postcard or sealed envelope and send them to: **Autodesk Competition, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW.**

Entries arriving later than Tuesday 31 May get recycled.



1) What hardware is required to run Autodesk *3D Studio*?
a) An expensive Unix workstation
b) A 386/486/Pentium PC
c) A Cray supercomputer

2) How can you improve the rendering performance of PCs?
a) Use network rendering
b) Install a liquid-cooled accelerator
c) Cross your fingers and pray for the 686

3) *3D Studio* is made by Autodesk. Are Autodesk:
a) A large CAD software company?
b) A medium-sized HAM software company?
c) A small RIP software company?

4) The *3D Studio* package includes:
a) A CD containing ambient music to listen to while you're using the software
b) A CD containing all the instructions
c) A CD-ROM containing over 500Mb of sample images, models and data

5) Name two computer games companies who use *3D Studio* to produce their computer graphic images and characters.

Smallprint: No employees of Autodesk or Future Publishing, or their relatives, may enter this competition. Or there'll be hell to pay. The decision of **Edge**'s editor, whosoever he may be, is final, and no quibbling will be entered into. And if you haven't got a PC, tough.


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Brought back to life, Alita has no memory of her past, but when her extraordinary powers are realised she enters the cut-throat world of the hunter-warrior.
A cyberpunk tale of strange and terrible beauty where life is hard and cheap... and only the strong survive.
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Saturday 30 April:
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Saturday 7 May:
EDINBURGH ODEON
Friday 13 to Saturday 14 May:
ROBINS 051 CINEMA, LIVERPOOL
All screenings are late-night performances. All dates and venues are subject to change. Please check local press for details.

Pagan – Ultima VIII PC **Pebble Beach Golf Links** 3DO **The Horde** 3DO **Fatal Fury 2** PC Engine **The Art OF Fighting** Neo Geo **Super Metroid** Super NES **The Sentinel** All formats

Testscreen

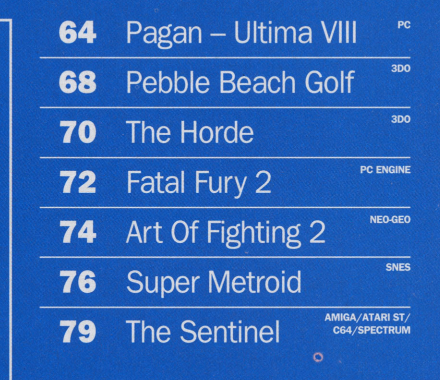
Once again, things are fairly quiet on the games front, with no real classics or mould-breakers emerging from the current all-formats crowd.

Ultima VIII stands out as something of a standard-bearer, with its rendered sprites, isometric-perspective gameworld and classic adventuring playstructure.

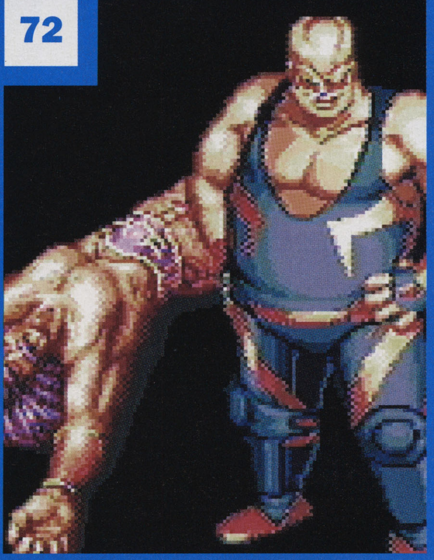
The 3DO system justifies its existence with *The Horde* – an unusual arcade god-game, played using a similar viewpoint to *Ultima*.

But, sadly, for real innovation you have to pay a trip to **Edge**'s Retroview page, showcasing a game from the good old days when they didn't make 'em like that any more. *The Sentinel*, Geoff Crammond's astonishing game, defies categorisation and has never been bettered for sheer tension. So what might a 32bit texture-mapped version be like? E


74




79


72



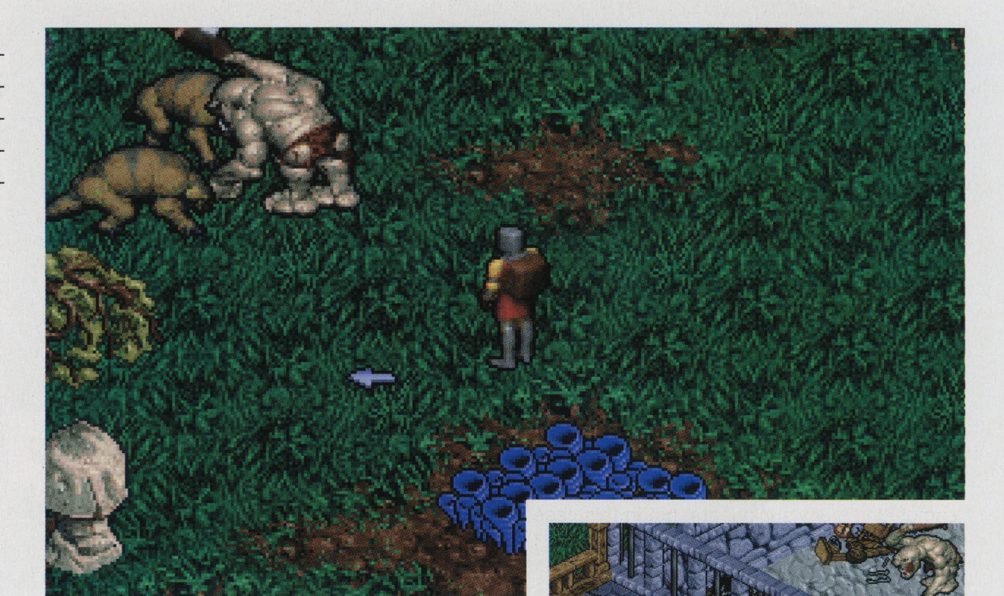
64


70


68

Pagan: Ultima VIII

Format:	PC
Publisher:	Electronic Arts
Developer:	Origin
Price:	£45
Size:	8 disks
Release:	Out now (UK)



As you wander around, you're distracted by the sound of a troll molesting a pair of innocent Toraxes



Follow the troll back home and there's the wounded Torax dying on the floor

The Avatar's had a tough life. He's had to battle against orcs, ogres, demons, giant spiders, evil priests, overlong plots and an ever-changing perspective since the beginning of time – or at least since the beginning of the PC, when the first *Ultima* game appeared. Now, with chapter eight, the technology has finally caught up with the ambitious ideas of Richard 'Lord British' Garriott, the creator of the games.

Once again we have the Avatar's nemesis, the Guardian, to thank for the plot. This otherworldly Darth Vader wannabe has banished Avatar to the world of Pagan, a lonely place populated by oppressed citizens and freaky wildlife, simply because that's the sort of demigod he is. Avatar is thus forced to seek a way back to Britannia, his adopted home, and you can bet that the only way he's







Get too close to this abandoned shack (left) and the Guardian gives you a warning to keep away. Naturally you don't, and end up falling through the floor into the dungeon below (middle). Even if you escape the troll, there are plenty of other creatures ready to rip your ears off (right)

Behave...



Chatting to the smith (main) is all very well, but don't try nicking anything, or with a flash of fire (inset)...





... A demon appears and, at the behest of the smith, unleashes an explosion which reduces you to twitching bloody lumps of meat

going to manage that is to save the island from its imminent destruction at the hands of the Titans, Pagan's own gods.

As ever, attaining this goal involves completing many sub-quests, but in this case it's hard enough finding out what they are, let alone how to complete them. The game's non-linearity is so well developed that at first you simply haven't got a clue where to start. As it turns out, though, it's not important. Nearly every character fills you in on background detail, so if you forget to ask someone what the bloody hell a Theurgist is, you can be certain the next person will know.

The lack of a map is initially daunting, but Pagan's geography soon becomes familiar. There's Tenebrae, the main city and home of Mordea, the despicable queen; the graveyard, awash with ghouls and necromancers; the poor side of town, where you're likely to be mugged by beggars; and the more remote (and scary) places, such as Sorcerer's Enclave.

Ultima VII was just far too big – being forced to yomp around acres of landscape simply to collect an object was realistic but ultimately tedious. *Ultima VIII* is a quarter of the size but has four times the animation and graphic detail – it's still gigantic but now it's more manageable and it looks exquisite too. The sprites were all rendered in *3D Studio* and then retouched, so the isometric 3D effect (as opposed to the pseudo-overhead views of the previous games) is always perfect. The Avatar himself has around 1200 frames of animation, and looks as close to being rotoscoped as is possible without actually doing it.

Remarkably, despite the game's complexity the screen is totally free of icons. The Avatar's movements (running, jumping, fighting, casting spells, talking, etc) are all controlled by the mouse; only your inventory and stats display require separate windows, and they can be dragged wherever you like. Familiarity with other *Ultima* or *Underworld* games helps in this context, because the control systems are similar, if slightly more fiddly. For example, Avatar won't look at or pick up an object unless he's near it. Theoretically this makes sense, but it can be a pain, especially if you're in a confined space, when our august hero ends up mincing about like a nervous big girl's blouse. The 3D sometimes makes getting in and out of doors tricky, too.

None of this graphical glory really means diddly-squat, of course, without a decent underlying story, and *Pagan* has got this coming out of its metaphorical ears. From the

Of **royal** descent

Lord British, ruler of Britannia in the *Ultima* series, also happens to be a real person. He's Richard Garriott, and he's been designing the games for... well, most of his adult life. The first game, written in BASIC on an Apple II computer, appeared in 1980, with tile graphics and wireframe dungeons. Garriott wasn't satisfied with his efforts, so he learned machine code and wrote the sequel. But he wasn't happy with that, either, so in 1983 he created *Ultima III*, and also founded a company – Origin – to publish it.

Even before *Ultima VIII* was finished, Garriott was already planning numbers IX and X...

Continued next page





Chest pain

After some delicate leaping (top left) the chest you're trying to reach turns out to be booby-trapped (above)



With the magical scrolls from the chest and a bloody great scimitar you're well equipped to deal with the ghouls and worse which you find in the prison further on in the game





This is your enemy, the Guardian (top). In the intro, he picks you up and drops you into the water surrounding the island of Pagan (bottom)

Continued

moment you wake up on a beach at the start, through to the final confrontation with the Guardian, you're besieged by text. There's no getting away from it. Even chatting with the lowliest beggar in the street spews forth a wodge of incidental plot detail and background, some of which is important, some not. You can find books lying in abandoned cottages miles from anywhere containing pages and pages of children's rhymes or instructions for removing a venom sac from a Kith (you'll know a Kith when you see one). Although much of this is pointless, it reinforces the Tolkienesque idea of an entire new world and only serves to make the game more realistic. You don't need any knowledge of previous games, either: the Britannia mythos is left behind completely.

Ultima VIII is initially disappointing. The scrolling leaves much to be desired even on a 486DX2 66MHz machine, and while there are plenty of atmospheric spot effects and chunks of speech (with the optional Speech Accessory Pack), it's not as in-yer-face impressive as, say, *Underworld 2*. Only after a few prolonged sessions does the richness and detail become apparent, and then the sheer depth of it all swallows you up completely. It's occasionally frustrating, long-winded and seemingly impossible, yet if you stick with it you'll find *Pagan* one of the most involving and rewarding places you've ever visited.

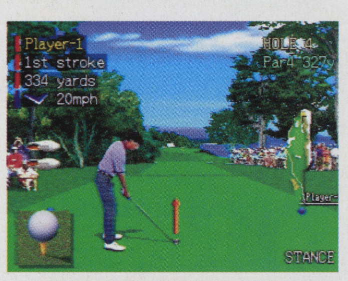
Edge rating: **Nine** out of **ten**

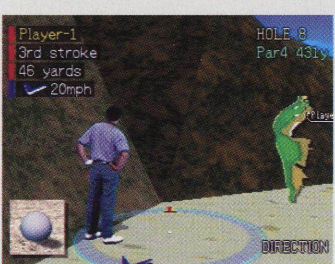
Pebble Beach Golf Links

Format:	3DO
Publisher:	Panasonic
Developer:	T&E Soft
Price:	£55
Size:	1 CD
Release:	Out now (US)



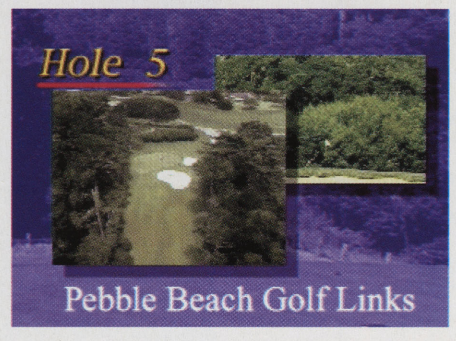
With five strokes already taken, this putt (above) is crucial. Don't forget to check the wind speed before you tee off (inset). The crowd goes silent as you prepare to hit the ball (above right)





The power curve (top) determines a shot's strength and accuracy. This arrow (middle) lets you decide the curve of the shot. You'll need more than a club to get out of here (bottom)

For most developers, golf simulations are a safe genre to tackle. Nothing about a golf game has to be particularly outstanding; it just has to be functional. But with *Pebble Beach Golf Links*, T&E Soft have made a bold attempt to break the mould and produce something special.



Unfortunately, the *CinePak* FMV sequences load in whether you want to see them or not

Set on the famous Californian golf course of the same name, *Pebble Beach* is a superbly presented and very playable sim. The digitised golfers work surprisingly well and the pre-rendered courses take very little time to draw after each shot. Like the real thing, it's also very rewarding. After you've familiarised yourself with the rather tricky control system, you'll soon be hitting long drives down the fairway with great precision, and a feeling of immense satisfaction invariably results.

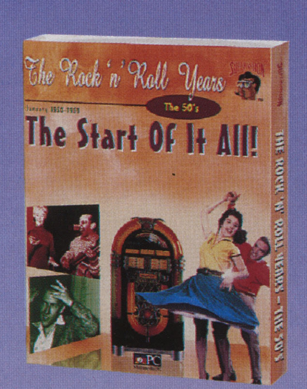
However, a few little niggles make the game slightly irritating. Being forced to wait over half a minute for a digitised fly-by of the course to load up – and then having to wait a further 30 seconds for the actual course to load in – is frustrating. And spectators with the uncanny ability to enthusiastically cheer and applaud a great shot without moving a pixel are not calculated to impress.

There's also no 'ballcam' mode, but fortunately this doesn't mean you have to just stand and watch as your shot disappears into the distance. Instead, 'cameras' dotted around the play area show the progress of your shot as it flies down the course – a system which works surprisingly well.

With a multitude of play options, including Skins Play, Tournament Play, Open Play, Stroke Play and Match Play, *Pebble Beach* has enough lastability and playability to overcome any gripes. 3DO sports fans should find it a worthy investment.

Edge rating: **Seven** out of **ten**

SUPERVISION

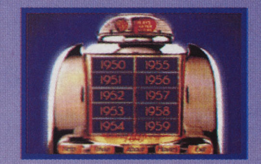


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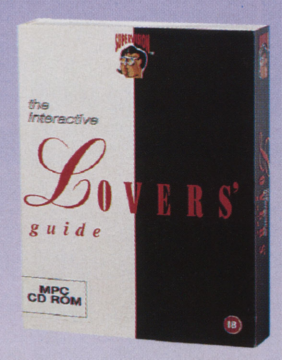
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The Horde

Format:	3DO
Publisher:	Crystal Dynamics
Developer:	In-house
Price:	£55
Size:	1 CD
Release:	Out now (US)

No-one can deny that the initial batch of 3DO software was pretty poor. The result was that people who rushed out and bought a 3DO found themselves in an embarrassing situation: they were the owners of one of the most powerful home machines available, and yet they had nothing decent to play on it. But now things have started to look up. First there was the superbly playable *John Madden Football*, and now comes Crystal Dynamics' third 3DO offering, *The Horde*.

The difference between *The Horde* and Crystal Dynamics' other 3DO efforts is immediately apparent. *Total Eclipse* and *Crash 'n' Burn* relied on texture-mapped polygons and fast action to seduce the player, but their lasting appeal was always in question.

The Horde, in contrast, has no fast-moving, smooth-scrolling landscapes to admire, and there seems to be little in the way of frantic action. At first it appears to be nothing more than a basic hack 'n' slash action game with simple *SimCity*-like sections thrown in for good measure; all you seem to have to do is build a few fences around your town, dig a few traps here and there, and then take on a few marauding monsters. But when you come to the end of your first year in charge of the monster-infested town, only to find that you haven't got enough money to pay your tax bill, the game's depth becomes clear.

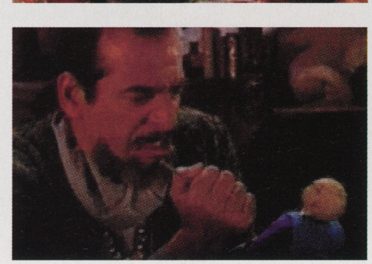
The Horde is in fact a subtle and addictive blend of strategy and action. Like in *SimCity*, the objective is to make your town prosper. To do this you have to make it desirable enough for local townsfolk to move into – the more people who move in, the more money you make. Simple in theory, but definitely not in



The evil Hordlings are running riot in your town. Use your Grimthwacker (sword) to end their fun



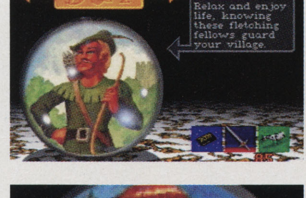






Digging pits (above and top left) is a useful way of protecting your precious cows from the ravages of the Hordlings. FMV scenes like these (left) feature heavily throughout the game

Weapons







You can use various methods to keep the Hordlings at bay. Walls (top left) are a useful barrier against the attackers, while the flamethrower (top right) is a devastating close-range weapon

Self-**defence**

Although your character is armed with a sword, that alone won't be enough to keep the Hordlings at arm's length. Luckily, you have access to a weapons shop. Make enough money and you could be the proud owner of a teleporting ring (below), useful for getting around town pretty sharpish, or you could buy an army (of foot soldiers or archers) to defend you.

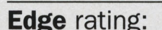


practice. You're given just two minutes to make your town a safe and pleasant place for people to live; after that, your arch-enemy, the evil High Chancellor, Kronus Maelor, sends in an army of Hordlings to do as much damage as possible to your burgeoning settlement, and it's your job to try and fend them off.

It's an idea that works surprisingly well. You soon learn the best ways of generating money and the most efficient ways of tackling the Hordlings, and then *The Horde* develops into an extremely playable action adventure. Graphically, it may not be quite in the same league as *Total Eclipse*, but it still has some very nice rendered images – the grazing cows are particularly impressive. But even if you ignore the graphics, *The Horde*'s challenge and depth of gameplay put it head and shoulders above almost anything else currently available on the 3DO.

The ironic thing is that *The Horde* doesn't really need the 3DO's capabilities. Unlike *Total Eclipse*, the game could have been accomplished just as successfully on the SNES or Mega Drive; the 3DO's superior graphics only enhance what is already an excellent concept.

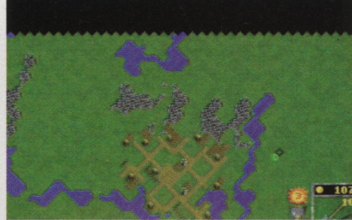
Encouragingly, Crystal Dynamics seem to have realised that the bedrock of any game is decent gameplay: graphics should always be in the service of playability, not vice versa. This is an attitude which other software companies would do well to note.



Edge rating: **Eight** out of **ten**



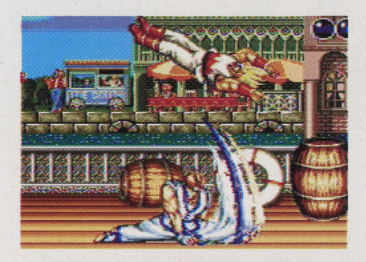
The Juggernaut Hordling (inset) is very dangerous – although slow and lumbering, he's almost invincible in battle. To attract more residents to your town, you have to keep making improvements (above)



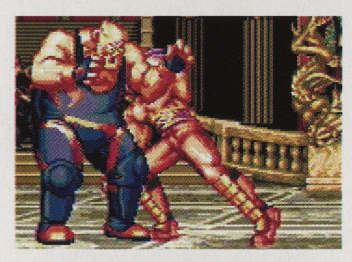
You can bring up this useful map (above) at any point in the game. Use it to see in which direction the horde is attacking from, or to view your town

Fatal Fury 2

Format:	PC Engine
Publisher:	Hudson Soft
Developer:	In-house
Price:	£65 (Arcade Card £80)
Size:	1 CD
Release:	Out now (Jap)
Supplied by:	Raven Games 081-663 6810









(From top) Andy Bogard leaps over Kim's leg attack; Axel delivers a power bolt; Krauser takes on Big Bear; the two Arcade Cards



Kim attempts to stamp the stick out of the hands of the appropriately named Billy Kane

The raft stage sports one of the most impressive backdrops in the entire game

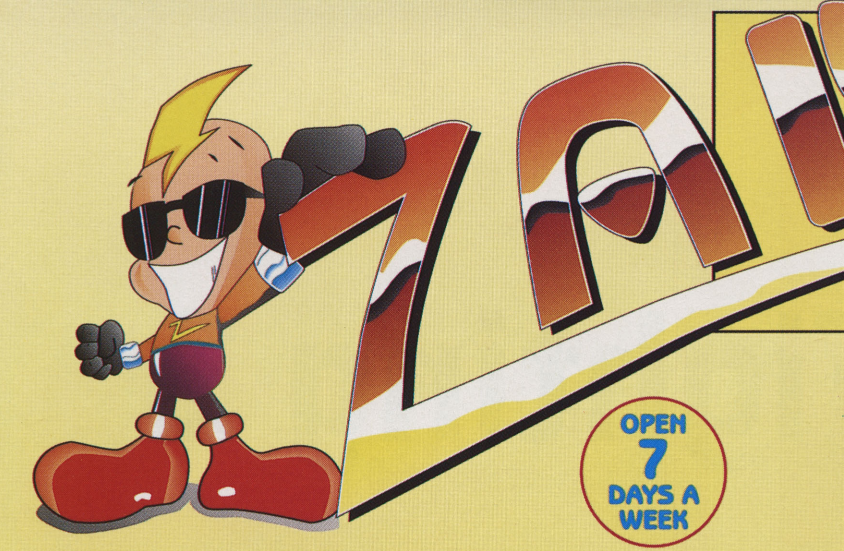
For years, PC Engine owners have had to live with the fact that their machine was ideal for producing fast action shoot 'em ups but, due to memory limitations, not so clever when it came to beat 'em ups. However, thanks to NEC's new Arcade Card add-on, which increases the PC Engine's memory capacity to an incredible 2 megabytes – giving the ageing 8bit machine a much-needed boost in the process – that's all about to change.

And what better way to test the card than by converting one of the Neo-Geo's most impressive beat 'em ups to date, the 106Mbit (about 8Mb) *Fatal Fury 2*? Despite the PC Engine's 8bit shortfall and 2Mb memory limit, Hudson have managed to produce a game which easily puts both the SNES and Mega Drive versions to shame.

Everything's here: all the speech, all the moves, all the characters and all the backgrounds. The only complaints are that a few frames of animation are missing on one or two of the fighters, and some of the backgrounds don't have quite as many colours as the original, but that's it. And aesthetics aside, *Fatal Fury 2* plays exceptionally well, providing a tough challenge for one player even on the easy difficulty setting.

Fatal Fury 2 is a remarkable achievement which bears witness to the programming talents of Hudson Soft. And what with *Strider*, *World Heroes 2* and *Art Of Fighting* all scheduled for the Arcade Card, the PC Engine's life is far from over. Show this to your SNES, Mega Drive or even Neo-Geo owning friends; they won't believe it's a PC Engine game and you'll be left wearing a cat-who-just-swallowed-the-canary smile. E

Edge rating: **Eight** out of **ten**



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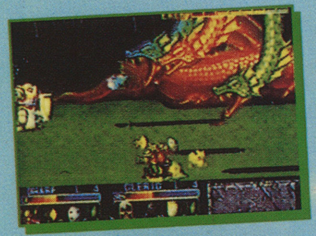
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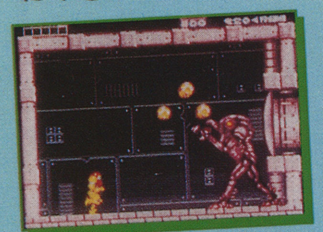
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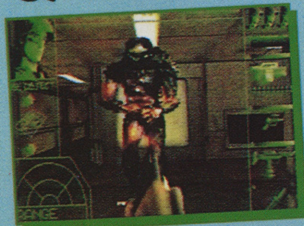
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Art Of Fighting 2

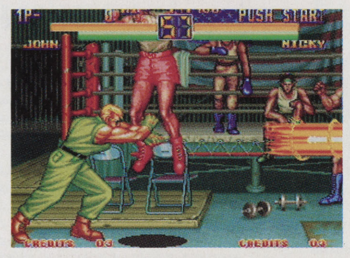
Format:	Neo-Geo
Publisher:	SNK
Developer:	In-house
Price:	£170
Size:	178 Mbits
Release:	Out now

There's something not quite right about SNK's latest Neo-Geo beat 'em up. Granted, it looks and sounds great, but somehow that doesn't seem enough. The problem could be that we've seen too many beat 'em ups and SNK's most recent attempt at the genre isn't different enough to make any real impact. Or it might simply be that – gasp – *Art Of Fighting 2* just isn't the great beat 'em up everyone was hoping for.

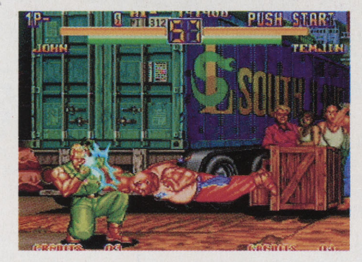
To be honest, the original *Art Of Fighting* never really set the world alight. Although it was superbly presented – with huge, well-animated characters and some astonishing music – it lacked any real strategy element. In an attempt to make this sequel a little more interesting to play, SNK have included a few extra features, but sadly, they can't disguise the fact that this is essentially a substandard beat 'em up.

In fact, one of the new features – the 'Rage Gauge' – actually handicaps the game. Every time you use a special move, your character's Rage Gauge decreases. When the gauge completely runs out – which doesn't take long – your fighter finds himself devoid of special moves. Good feature, eh? There is a way of replenishing the gauge, but you have to move out of your opponent's striking range first – which, let's be honest, doesn't happen very often in a one-on-one beat 'em up. To make matters worse, the opposing fighter can 'raz' (taunt) your fighter's Rage Gauge down – this is one case where words *can* hurt you.

The result is that in twoplayer mode you're forced to abandon the use of special moves and have to settle instead for a boring exchange of blows to determine the winner. This is silly, because special moves are what distinguish the good beat 'em ups from the







John Crawly unleashes his Mega Smash (top) while Mr Big gets one in the face (middle). Temjin (bottom) displays his versatility

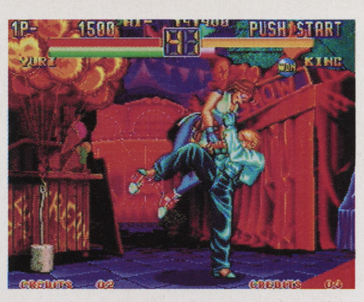




Although visually impressive (main), *Art Of Fighting 2* is sadly lacking in the gameplay department. Ryo shows off his Thousand-Kick Crunch while a bemused horse watches from the sidelines (inset)







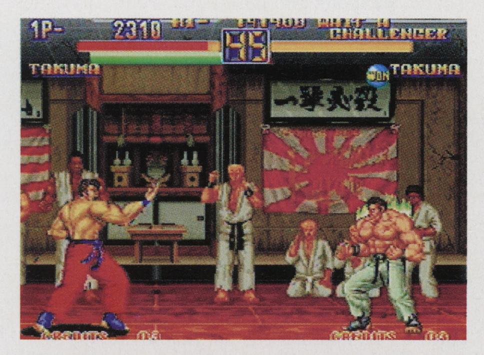
The mighty Jack (above) lands a blow on the normally slippery Eiji. Ryo's Rage Gauge has already run out (top right) so his fireballs are now useless. Yuri and King (above right) get to grips

poor ones. Imagine playing *Street Fighter II* or *Mortal Kombat 2* and only being able to use three special moves before having to recharge some silly gauge. You'd lose interest very quickly, right? And that's precisely what happens in this game.

On the plus side, *Art Of Fighting 2* does look very nice. The screen zooms in and out a lot more smoothly than before, and the characters are much better defined. Some extra fighters are included, and there's a great game speed feature. The sound effects have also been improved, but unfortunately the same can't be said of the music: although the tunes are good, they're nowhere near as enjoyable as the originals (although, to be fair, that would have been a tough job).



Hefting a pair of heavy sticks, Mr Big plays nick-nack-paddywack on John's head



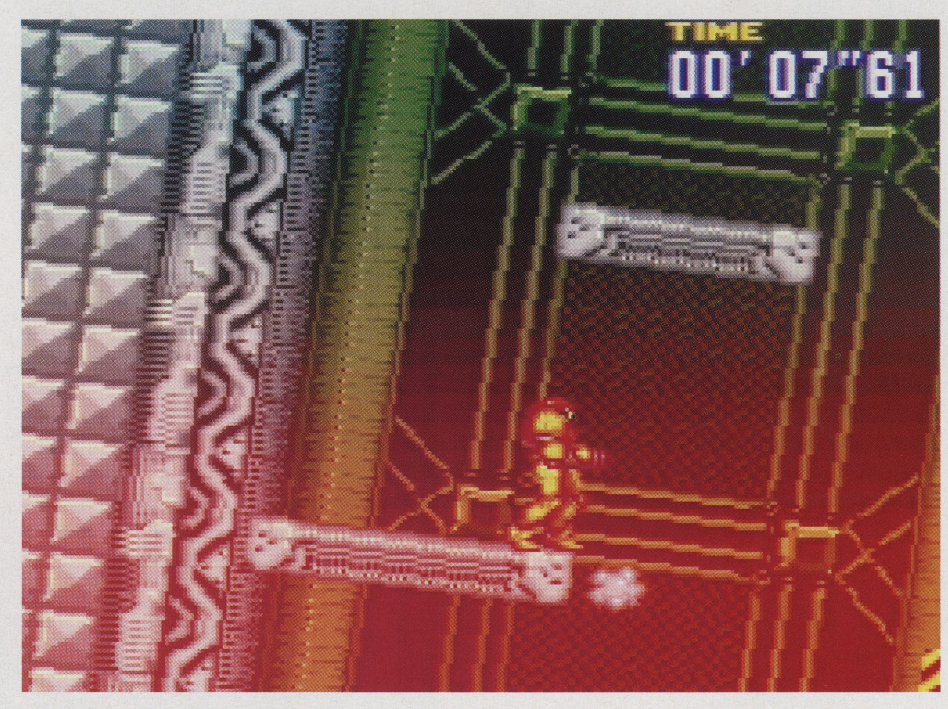
One fighter 'razes' while the other tries to restore his Rage Gauge. A pointless exercise

It's a pity that SNK seem to devote so much of their time to developing these one-on-one beat 'em ups. They already have the excellent *Fatal Fury Special* and *Samurai Shodown* in their stable, so why bother producing more of the same? Especially if they're as boring to play as this. *Art Of Fighting 2* will no doubt be warmly received by many Neo-Geo owners, but even the most devoted beat 'em upper will eventually tire of the game's repetitiveness.

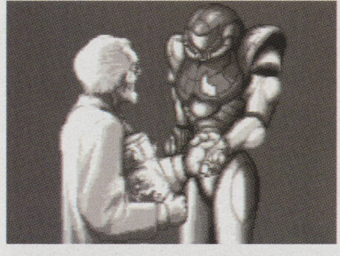
Edge rating: **Five** out of **ten**

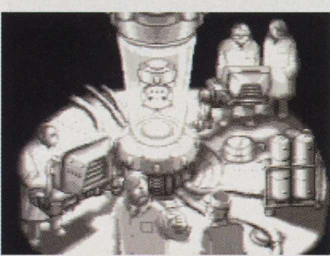
Super Metroid

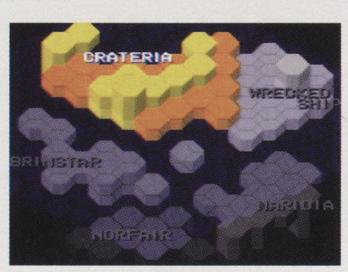
Format:	SNES
Publisher:	Nintendo
Developer:	In-house
Price:	£75 (import)
Size:	24Mbits
Release:	Out now (Jap)



After the first boss is defeated, you're given just 60 seconds to get off the space station before it explodes. To make matters even more difficult, the screen starts swaying in a Mode 7 kinda way







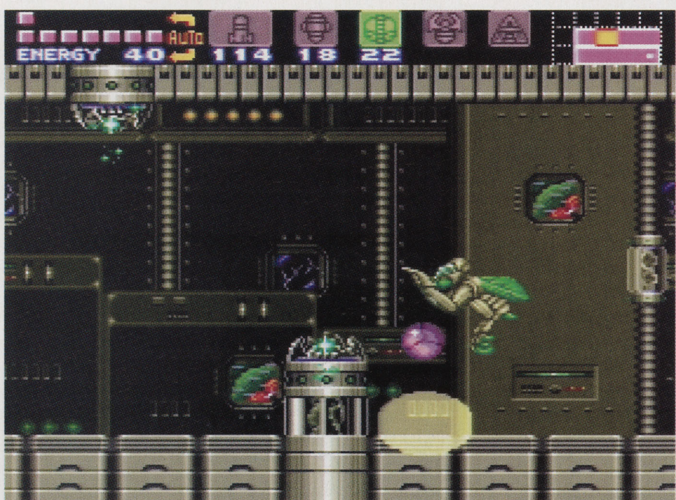
***Super Metroid* boasts an atmospheric cartoon-like intro (top and middle). This map (bottom) shows the play area**

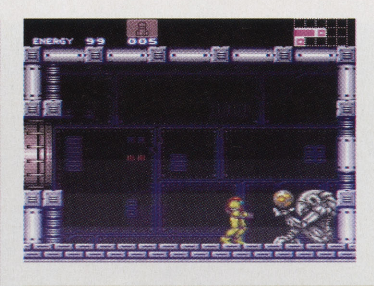
The original *Metroid* on the NES was a platform shoot 'em up which is nowadays regarded as something of a classic. This SNES sequel may well acquire a similar reputation in years to come, but describing it as a platform shoot 'em up doesn't do it justice; 'futuristic-side-on-scrolling adventure with *Zelda*-esque overtones' is a more accurate description.

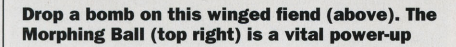
The storyline continues from where the NES game left off. Although the evil mother brain's plan to wipe out the planet Zebes was foiled at the end of the original title, a single larva apparently managed to survive the final onslaught. Captured by the heroine, Samus, the larva was taken to the planet Ceres for the purposes of scientific research. Satisfied that the threat of global destruction had been averted, Samus then set off in search of a new mission. But the larva soon started emulating the wicked ways of its antecedents, and before Samus could say, 'I'll be back in a millennium,' Ceres' inhabitants had sent out a distress signal which couldn't be ignored. And so, once again, battle was joined against the forces of darkness.

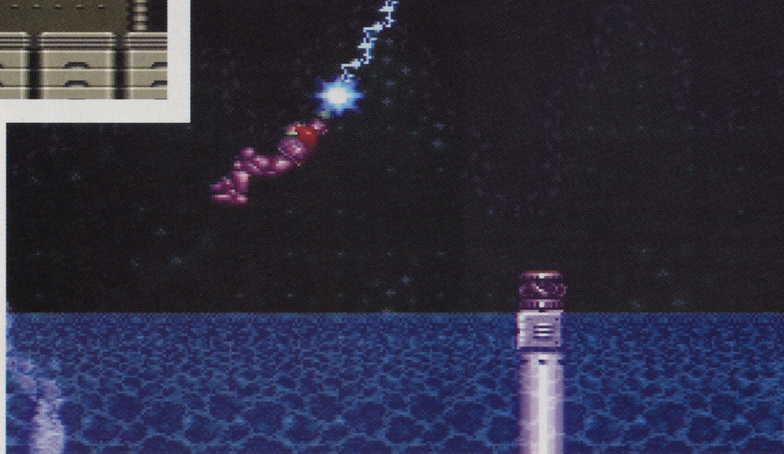
The plot is predictably ludicrous, but more worrying is the fact that *Super Metroid*'s gameplay at first seems very pedestrian. It's essentially the same as that of the NES game: all you have to do is explore the usual platform-esque maze, kill a few aliens and collect weapons and power-ups. Your objective, of course, is to find the killer larva and destroy it. But although *Super Metroid* looks derivative to the disinterested observer, when you take hold of the control pad yourself and spend some time with the game you begin to realise how intensely playable it actually is.

In true Nintendo tradition, *Super Metroid* starts very slowly. At first, your character only has a basic weapon and you haven't got a clue what you should be doing or what route you should be taking. But the game is structured so that initially you can only follow certain paths, and these paths channel you towards weapons and other helpful items which then allow you access to other parts of






Drop a bomb on this winged fiend (above). The Morphing Ball (top right) is a vital power-up



The Electric Rope – another of ***Super Metroid*****'s handy power-ups – in full swing**

the game. In no time at all you realise you've got a sprawling game on your hands, with a huge play area to explore. Thankfully, you're given a computerised navigation device that shows your current position on the planet, as well as the locations you've already visited and the areas still to be explored. And by plugging yourself into an information post you can access even more details about your surroundings: where useful items are hidden, the position of lifts, and even the position of the larva itself.

Like many classic games before it, *Super Metroid* is full of memorable moments. For example, the first time you pelt across the screen wearing your super-boots, your speeding sprite produces a smear effect across the screen. There's also a section where the door to the next stage lies beyond a deep lagoon; the only way to the other side is to swing, Spider-Man-style, across the water using your electric rope. It's inventive touches like these that much of today's software lacks.

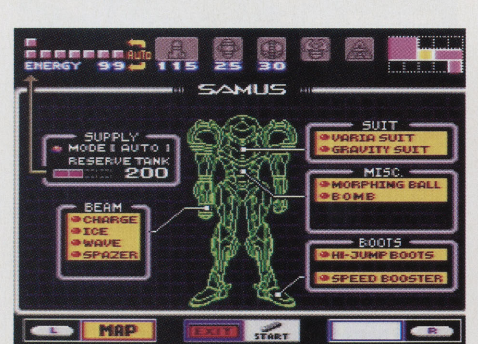
The trick in *Super Metroid* is to keep going. There comes a point where it seems that you've done everything and seen everything, and there's apparently no way to complete the game. This is when less determined players tend to give up, with the result that they never get to appreciate the game's depth. But more dogged explorers know that there's something they've missed, and they simply go back and try again... And again... And again... Eventually, persistence pays off.

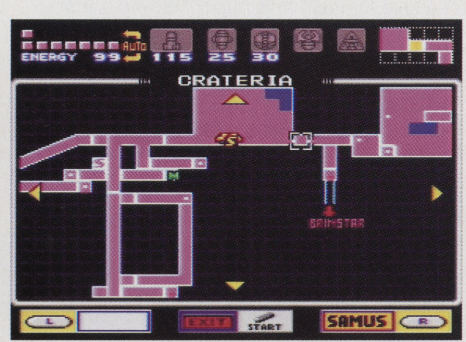
In fact, persistence pays off rather too well, because despite the game's size, a moderately resolute player will be able to finish *Super Metroid* in around 12 hours' game time. And the three 'save game' settings thoughtfully provided by Nintendo certainly

Weapons

Weapons and power-ups aren't just helpful in *Super Metroid*; they're essential. Items such as mines, rockets and bombs – useful for getting through doors as well as blowing up the enemy – are readily available, but other objects, like the 'Morphing Ball' and 'Electric Rope', are generally hidden down secret passageways and may take some finding. The Morphing Ball allows you to curl up into a ball and get through small gaps, while the Electric Rope lets you swing, Tarzan-like, through the air.

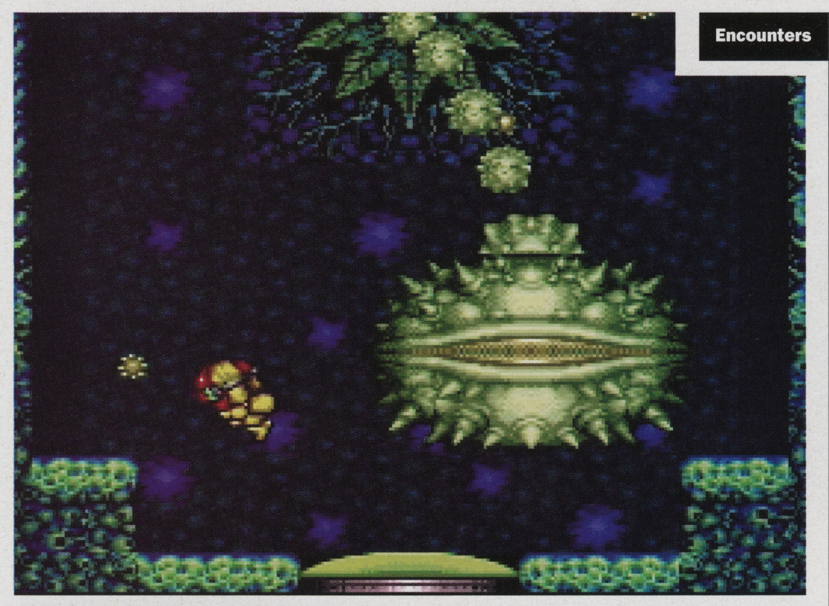
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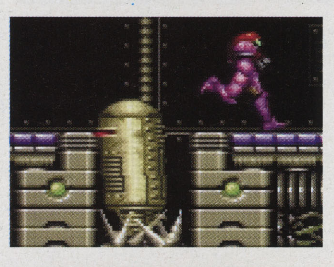
At any time in the game you can bring up a host of useful windows. One screen (left) informs you of the weapons you've collected, while another (right) shows your position on the planet

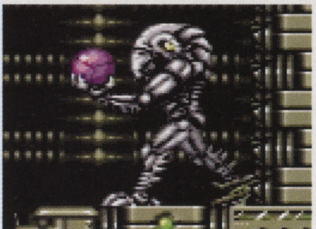
Encounters



This giant Venus flytrap is a tough foe. Wait for it to open up before letting loose with your missiles







The game's initial boss (top). These droids (middle) can't be killed. This helpful robot (bottom) lends a hand – literally

don't help in this respect. At 24 Mbits, the cartridge may be one of the biggest ever on the SNES, but your premature arrival at the game's conclusion makes you wonder where all those megabits went to.

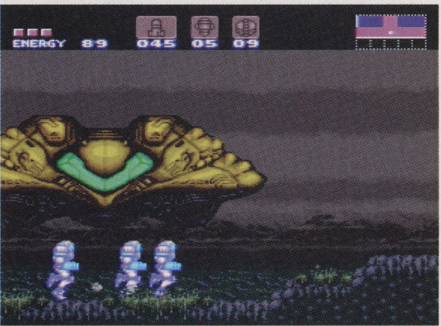
It's obvious that precious few of them were wasted on the graphics, because *Super Metroid* is a long way from being one of the most aesthetically pleasing games ever to appear on the SNES. But although the visuals couldn't be described as mindblowing – in fact, some of the levels look downright dreary – they do their job. The sound is a little more stimulating, with some superb orchestrated tunes, but they do have a tendency to drone after a while.

Apart from *Goemon 2*, there has been very little in the way of quality software for Nintendo's 16bit machine lately. The days when you would plug in a SNES cartridge and be astonished by what you saw are obviously gone for ever, but there's still room for challenging, action-packed titles with an engrossing environment in which the player can lose himself. And *Super Metroid* is just such a game.

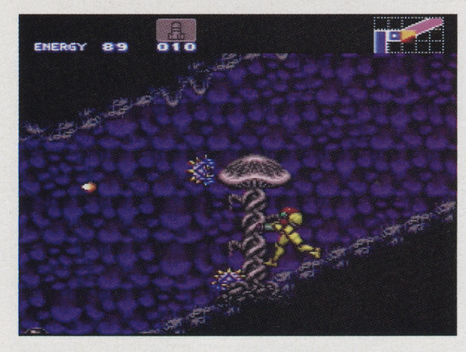
Super Metroid will take your emotions on a rollercoaster ride of joy and pain: one moment you'll be throwing your head back in sheer ecstasy after defeating a boss in a battle of heroic proportions; the next minute you'll find yourself furiously stabbing the reset button in complete frustration. Those who enjoyed the first game will therefore have no complaints about the action, but many people will find the SNES title's distinct lack of longevity a bit of a let-down.

Edge rating: **Eight** out of **ten**







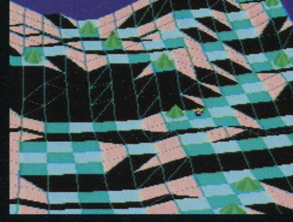


(Top to bottom) This dragon is a force to be reckoned with. Special boots let you run fast. Stun these flying beasts with your freeze gun. Exploring turns up lots of strange things

Every month **Edge** dusts off a milestone in gaming history, from home computers to coin-ops, and finds out if it has stood the test of time

The Sentinel

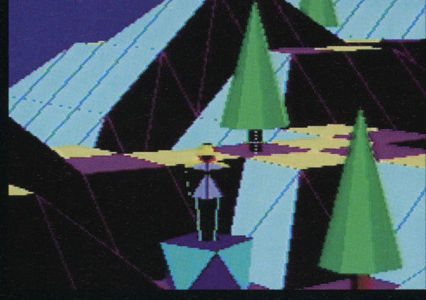






Format:	Spectrum, C64 Amiga, Atari ST
Publisher:	Firebird
Developer:	Geoff Crammond
Players:	One
Price:	£8-£20
Released:	April 1988

Virtual paranoia: is the sentinel turning towards or away from you? There's only one way to find out: wait



The map lets you see the whole level (top). Sentries (middle) have to be dispatched. Blocks allow you to climb higher (above)

If there is such a place as software heaven – the last repose of departed games – you can bet that perched high on an plinth, casting huge shadows over even the most respected classics, would be *The Sentinel*. Make no mistake: Geoff Crammond's 3D paranoia trip is a work of genius.

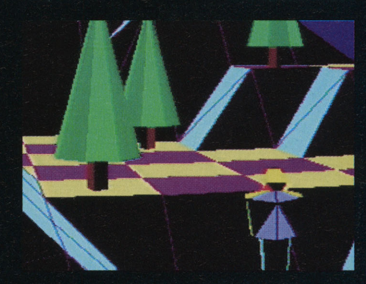
It's best described like this: you're trapped in a 3D world, rather like a huge chess board with a sculptured terrain. Every level is dominated by at least one sentinel – a robotic guardian who occupies the commanding heights and constantly rotates to survey the panorama below him. Your objective is to ascend to the highest point (moving around by cloning your droid in a new position and then transferring to the clone), absorbing trees to build up your energy and creating blocks to stand on so you can climb higher. Once you've reached the sentinel's position, you can absorb him, thus completing that level (and there are 10,000 of them, with each level jump determined by the energy you have left).

The problem is that whenever you move into a sentinel's line of sight your energy immediately starts to deplete – which induces a state of panic in even the most level-headed player, forcing him to scuttle around in a desperate search for cover in the angular recesses of the landscape. Creeping through a level trying to avoid entering the turning sentinel's field of vision is a tense and highly dramatic experience – perfectly complemented by the game's atmospheric sound.

Few games have come as close to capturing the feeling of 'being there' as *The Sentinel* – VR *is* possible on the C64. An essential gaming experience.

For those inclined to hark on about the golden age of gaming, **Retroview** is an open forum offering you the chance to pay homage to an all-time classic of your choice. Get your contribution (approx 250 words) printed and you'll be awarded a year's subscription to **Edge** (or an extra year for current subscribers). Address them to **Retroview, Edge, 30 Monmouth Street, Bath BA1 2BW**, or e-mail us via future@cix.compulink.co.uk, with a subject line **'ATTN: Steve Jarratt'**.







Trees provide energy, so this luxuriantly wooded landscape is a *Sentinel* player's paradise (top and middle). Meanwhile, the sentinel surveys his domain (bottom)

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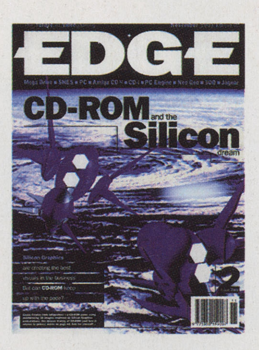
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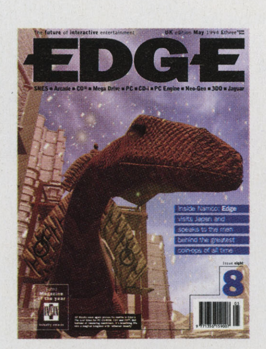
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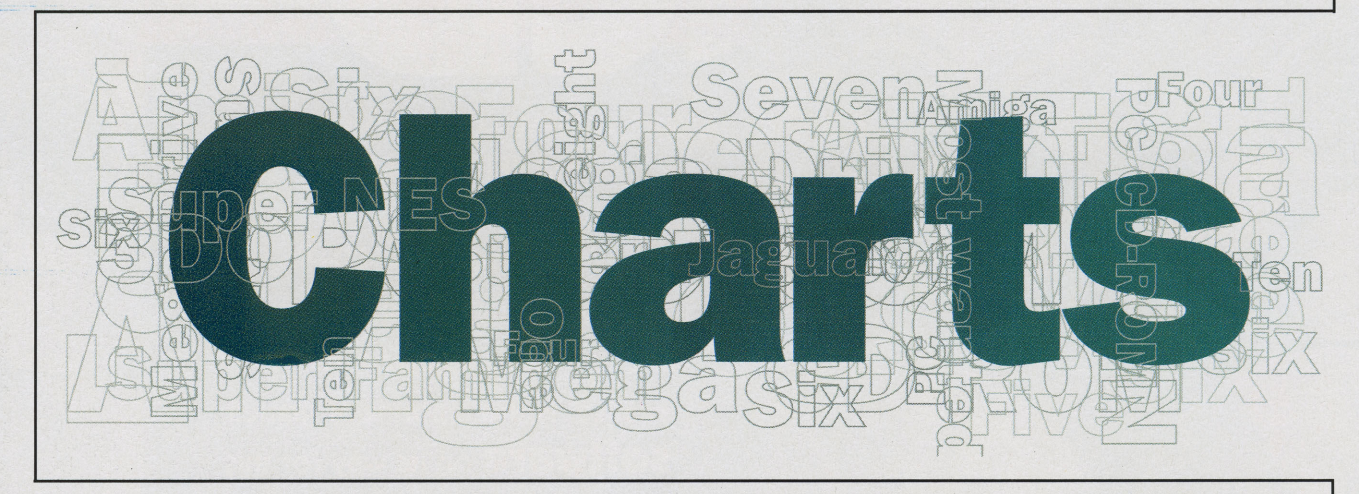
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Sonic 3 Mega Drive **Sensible Soccer** SNES **Microcosm** CD32 **Rebel Assault** PC CD-ROM **SimCity** PC **Ground Zero Texas** Mega CD **Ridge Racer** (arcade) **Final Fantasy VI** (Japan)



The very latest **charts** from across the entire world of videogaming

Mega Drive

1. **Sonic The Hedgehog 3** ***Sega (£60)***
2. FIFA International Soccer *Electronic Arts (£45)*
3. NBA Jam *Arena Entertainment (£50)*
4. Winter Olympics *US Gold (£50)*
5. Sensible Soccer *Renegade/Sony (£40)*
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7. Sonic Spinball *Sega (£45)*
8. Micro Machines *Code Masters (£35)*
9. Mortal Kombat *Arena Entertainment (£50)*
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SNES

1. **Sensible Soccer** ***Renegade/Sony (£45)***
2. NBA Jam *Acclaim (£60)*
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6. Aladdin *Capcom (£50)*
7. Striker *Elite (£45)*
8. Mario All Stars *Nintendo (£50)*
9. TMNT: Tournament Fighters *Konami (£60)*
10. Zelda III: A Link To The Past *Nintendo (£40)*

PC

1. **SimCity 2000** ***Mindscape (£40)***
2. Alone In The Dark 2 *Infogrames (£45)*
3. Premier Manager 2 *Gremlin Graphics (£35)*
4. Frontier: Elite 2 *Gametek (£40)*
5. TFX *Ocean (£45)*
6. Microsoft Flight Simulator V.5 *Microsoft (£40)*
7. Star Trek: Judgment Rites *Interplay (£45)*
8. Sam And Max Hit The Road *US Gold (£43)*
9. Indy Car Racing *Virgin (£45)*
10. X-Wing *US Gold (£46)*

US: all formats

1. **NBA Jam** ***Acclaim (SNES)***
2. NBA Jam *Acclaim (Genesis)*
3. NBA Jam *Acclaim (Game Gear)*
4. Sonic The Hedgehog 3 *Sega (Genesis)*
5. Wario Land *Nintendo (Game Boy)*
6. Mortal Kombat *Acclaim (Genesis)*
7. Mega Man X *Capcom (SNES)*
8. Secret Of Mana *Square Soft (SNES)*
9. Mortal Kombat *Acclaim (SNES)*
10. Lethal Enforcers *Konami (SNES)*

Amiga CD32

1. **Microcosm** ***Psygnosis (£45)***
2. Liberation *Mindscape (£35)*
3. Nick Faldo's Championship Golf *Grandslam (£35)*
4. Zool *Gremlin Graphics (£30)*
5. Sensible Soccer 92/93 *Renegade/Mindscape (£25)*
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Arcade: dedicated

1. **Ridge Racer** ***Namco***
2. Suzuka 8 Hours *Namco*
3. Outrunners *Sega*
4. Cybersled *Namco*
5. Virtua Racing *Sega*



Namco's visually astonishing *Ridge Racer* spearheads this month's dedicated arcade chart

Edge readers' most wanted

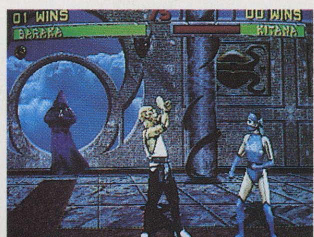
Which item of videogames hardware or software – real or vaporous – would you most like to get your hands on? Write and tell Edge your greatest desires at: Edge Most Wanted, Edge, Future Publishing, 30 Monmouth Street, Bath, Avon BA1 2BW.

1 Daytona GP *Saturn*



Edge readers seem to be into the new wave of driving games in a big way: last month's number one, *Ridge Racer*, has now been superseded by Sega's texture-mapped polygon extravaganza, *Daytona*

2 Mortal Kombat 2 *Jaguar*



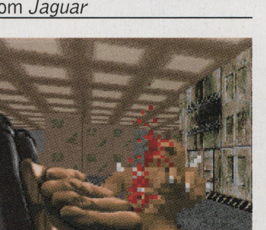
The rumours of a Jaguar version of *Mortal Kombat 2* have obviously set some pulses racing

3 Inferno *PC*



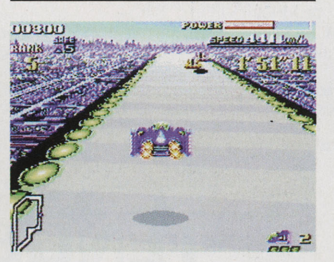
***Inferno* is the most eagerly awaited PC game for some time. Let's hope it delivers the goods**

4 Doom *Jaguar*



After the success of *Doom* on the PC, Jaguar owners also want a slice of the action

5 F-Zero 2 *Nintendo Project Reality*

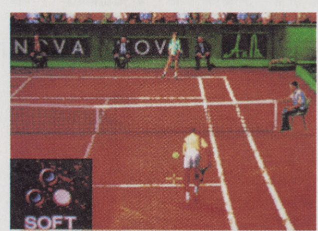


The game you all want to see on Nintendo's Project Reality is *F-Zero 2*. But what about Mario?

Arcade: PCBs

1 **Super Street Fighter II Turbo** ***Capcom***
2 Ultimate Tennis *Nova*
3 Grand Striker *Human Co.*
4 Raiden II *Seibu*
5 Denjinmakai *Banpresto*
6 Super Street Fighter II *Capcom*
7 Gunlock *Taito*
8 Mortal Kombat 2 *Midway*
9 Eco Fighters *Capcom*
10 Nostradamus *Face Co. Ltd*







***Super Street Fighter II Turbo* (top) is only just out in the arcades, but it has already stormed past *Ultimate Tennis* (middle) and *Eco Fighters* (bottom)**

Japan: all formats

1 **Final Fantasy VI** ***Square Soft (SFC)***
2 Super Famistar 3 *Namco (SFC)*
3 Mario Land 3 *Nintendo (Game Boy)*
4 Fatal Fury 2 *Hudson Soft (PCE CD)*
5 Lethal Enforcers *Konami (SFC)*
6 Fire Emblem *Nintendo (SFC)*
7 Super Puyo Puyo *Banpresto (SFC)*
8 Rockman X *Capcom (SFC)*
9 Sailor Moon R *Angel (SFC)*
10 Emerald Dragon *NEC HE (PCE CD)*







The much-hyped *Final Fantasy VI* (top) steamrolls to the top in Japan. *Super Famistar 3* (bottom) has also been well received, as has *Fatal Fury 2* on the PC Engine

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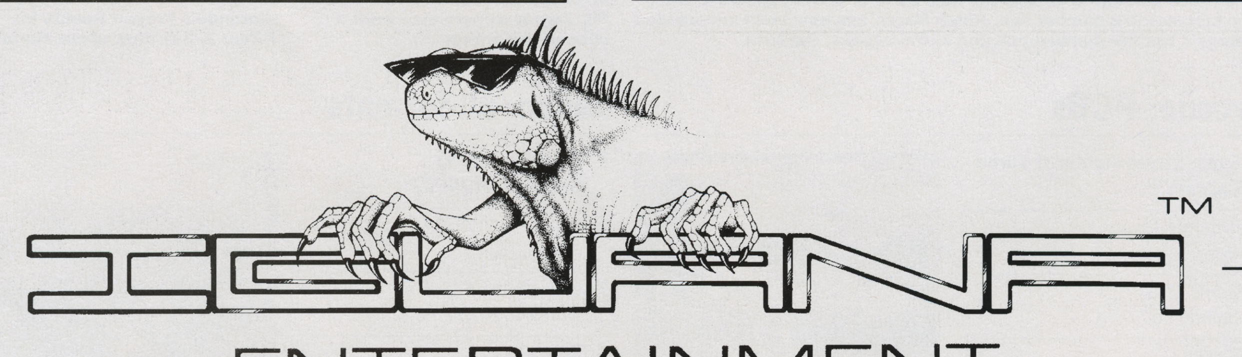
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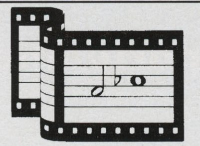
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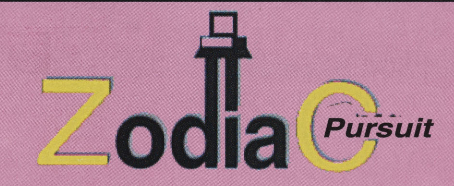
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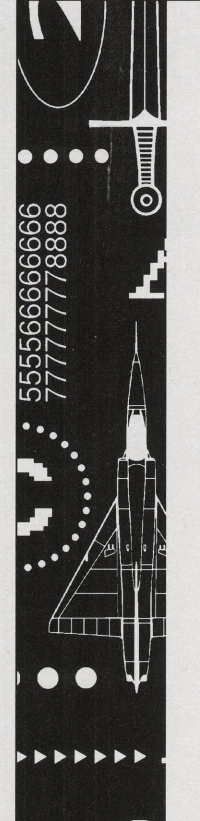
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'Even this generation of CD machines are *not* good enough'

An audience with

Jon Hare

Sensible Software supremo Jon Hare gives **Edge** a piece of his mind



Anyone who's into games will have heard of Sensible Software's *Sensible Soccer*. If you've been around a bit as well you might remember other Sensible hits like *Wizball*, from the days when computers had rubber keyboards and games players were more at home with tape drives and 16 colours.

Jon Hare and business partner Chris Yates set up Sensible Software in 1986 under the government's Enterprise Allowance Scheme, which enabled Jon and Chris to get off the dole and earn some money coding games for top software houses. The big break came when they travelled up to Ocean in Manchester with their new game demo and came back with a cheque for £1000 in their pocket.

After *Parallax* and *Wizball* for Ocean came *Shoot 'Em Up Construction Kit* for Palace, *Microprose Soccer*, *International 3D Tennis*, *Mega Lo Mania*, *Wizkid* – the sequel

to *Wizball* – and most recently, of course, *Sensible Soccer* and *Cannon Fodder*.

Jon is a friendly chap who has the appearance of the sort of sleepy person you find in your front room the morning after a party. But don't let this first impression fool you: he's got a mind like a sharp stick, and the remarkable success of Sensible Software over the last eight years is the proof of that. Most of the time he talks quickly, as if he's trying to get the words out before the ideas get lost, sometimes shutting his eyes to concentrate on what he's saying. He has a lot of opinions, all expressed with some force. This is one guy who doesn't take anything sitting down.

Edge Recently you've been very critical of the state of British software design. What do you think of the software business at the moment?

Jon I think we're fighting the technology. We're talking about doing a CD-ROM game at the moment, and we want music to be loading in the background and speech to be loading in, and we're wondering, if someone hasn't got their headphone socket in, are they going to be able to hear the speech and music and stuff? It really hampers creativity.

Edge What do you think of the current batch of new machines?

Jon You're compromised by the technology, and even this generation of CD machines are *not* good enough! What we really need is to have one standard format, like VHS or like CD music, which is on a standard format – if you buy a CD you don't get home and say, 'oh no, I've got a Toshiba hi-fi, I can't play it…'

'As long as we pigeonhole ourselves as this tiny little cult thing, we'll be stuck with that. We need to become mainstream'

Edge Why is one standard games machine the complete answer?

Jon What's the total computer userbase in Europe, or the UK? Say it's between five and ten million. But if you look at each individual format, it's not very much. If you knew you were going to launch a product that was going to hit five or ten million people, you'd do a lot more fine tuning and honing, etc. It would be worth it. I mean, we do hone – we worked hard to get *Cannon Fodder* and *Sensible Soccer* right, but then when the game gets converted and something has to be lost from the design, it's so depressing.

On the one hand people could argue that if you were being professional you would allow for the various conversions when you design the game, but another person could argue that it's more important to make it perfect for one machine. But you can't win, and the problem happens because there is more than one machine.

Edge It's hard to think how the number can be trimmed down…

Jon If software was single-format now, we'd be mainstream – we'd be up there with book writers, musicians, filmmakers. It's like if you've got someone off the street who doesn't know much about technology, and we've just done a game called *The Big Red Blob* or something. The woman in the shop says she wants to buy it, and the assistant says, 'What machine have you got, madam?' and she says, 'Oh, I'm not sure.' That's it: you've lost a sale.

Edge You wrote a letter about this to the trade magazine, CTW, didn't you?

Jon That letter was about the fact that with kids at school it's trendy to have a machine, it's competitive, and their knowledge about what the machines do… It's like when kids get to 17 or 18 and they say: 'Oh, he's got a 1.1 Escort and I've got a 1.3,' it makes all the difference in the world. And that's what the game machines are like. Because the games are targeted at males between the age of 10 and 25, who are the people who are going to care whether the technology they've got is more than other people, you're limiting yourself to that market. Whereas there are so many different games – not even just games, 'products' – that run on a computer that could be made for different sorts of people: for women, old people – yes, old people, 60-plus. If you could work around their technophobia, you could have a lot of older people who are housebound getting a lot of pleasure out of software. It's not directed that way, it's too complicated. When the Atari VCS was around, there was only one computer and everyone knew what it was. It was so simple then and it was much more mainstream.

Edge And as you say, you are stifled in the kind of creative avenues you have to follow, because of the narrow market.

Jon We can't say Margaret Thatcher did this, that and the other, like a stand-up comic can. You can't mention stuff like that or you get sued. In America you can't even… You can't talk about *anything*. You can't put a can of lager in… The list is endless of what you can't do. You can't touch people with things they recognise. If you want to sell a game, all you can do is write action games, aimed at males, that are inoffensive, don't really hit home at all, don't have any emotional content. All the games are like that, all of them fall into that category. The band is too narrow.

Edge Is this situation ever going to change?



Photographs: **Jude Edgington**

'We need to write a game that's going to reach as many people as possible, to increase our name and to make us as much money as possible. That's our business'

Continued next page

Jon Hopefully, the adoption of certificates will help. If we could do a proper 18+ game, then that opens a lot of doors – you're not going to worry that one of the console manufacturers is going to stop you from putting something in because it might offend somebody. Something's got to be done about what you can be sued for, in terms of reference to things. If you look at films and books, they can make references to things that we can't. It's like the decision to take the real names out of the console versions of *Sensible Soccer* – it's crazy, really. I've seen more footballers' names written in a copy of Shoot!, do you know what I mean?

Edge Do you think the games business is becoming a lot like the record industry – the attitude is, make a profit now regardless of the consequences later on?

Jon Exactly. If you look at what the music publishers have done with their product, they've strangled their market. They're aiming at a narrower and narrower band – it's got to be trendy, it's got to be 'now'. If you make things trendy, you give them a lifespan. It's like putting a 'sell by' date on them. That's the problem with machines that are fashionable.

Edge Fashion is a very short-sighted thing to get involved in, especially in a business which takes so long to produce anything.

Jon Hardware manufacturers have to understand how software developers work. We need to write a game that's going to reach as many people as possible, to increase our name and to make us as much money as possible. That's our business. If they bring out some machine which is fairly trendy, but their old machine's got a userbase 20 or 50 times the size, if they think we're going to spend a lot of time concentrating on their new technology 'because it's really great', they've gotta be crazy.

Sensi Soccer is on *11* formats now. If you look at the size of our company, we've got nine people in this building. If we had the other ten conversions going on of the game we've just finished, and we're also doing a couple of new games, and when we've finished those new games we've got to do 20 more conversions, you can see the amount of people we'd need and how diluted our attention would become. So we have to farm stuff out, and we end up being judged on other people's work. The solution is the single format.

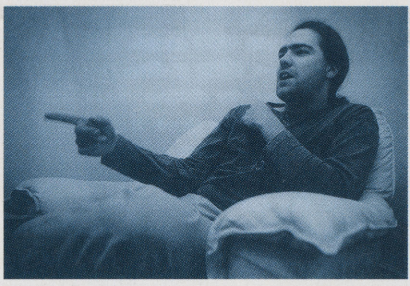
Edge You mean one really, really good machine that does everything. 3DO, perhaps? Project Reality?

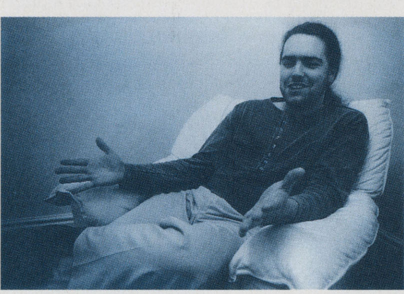
Jon There's a lot of self-justification going on at the moment; people are putting money into things and it's not been wisely spent, and they're trying to justify it now.

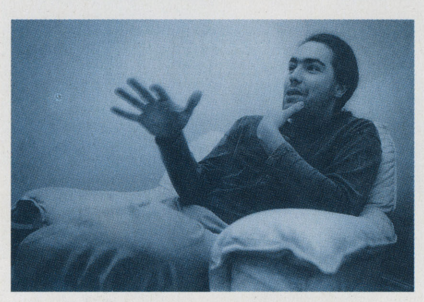
'If software was single-format now, we'd be mainstream – we'd be up there with book writers, musicians, filmmakers'

Edge What do you think about CD-ROM as a format? Are you looking into it?

Jon There have been times before where we've been told you have to do things in a certain way. If you're not imaginative that's true. But if you've got a bit of imagination you can find another way to do it which a) doesn't cost as much and b) is just as good or different. Everyone thinks CD-ROM games ought to look a certain way at the moment. It's either going to be video footage, or it's going to be this pseudo sci-fi-looking 3D rendered images. We're working on something which is totally separate from those. If you want to watch a video you go and buy a bloody video player. If you buy a video film you don't watch it every day; you watch it, then stick it on the shelf, then maybe a month or two later, if you really like it, you load it up again. Whereas with a game, you should be able to play it every day if you like.







'If you were going to launch a product that was going to hit five or ten million people, you'd do a lot more fine tuning'

Edge Should games makers be more like independent record companies, where people spend less money on things, take risks, and are a bit more creative and not bound by any notions of popular taste?

Jon To a certain extent, now that we've got our name on games a bit more, we are a slightly independent label, if you like. In the same way as Jeff Minter with Llamasoft, and The Bitmap Brothers, and Bullfrog.

Edge A brand name?

Jon Yes. But it's only recently that publishers have realised that by promoting us they can make money for themselves. At the moment people are buying licences to put them on computer games. Why can't someone buy *Cannon Fodder* and write a book about it? It doesn't have to be one way all the time. As long as we pigeonhole ourselves as this tiny little cult thing, we'll be stuck with that. We need to become mainstream. We need a single standard. Then you can have independent people taking a risk on new ideas, because they know they're hitting everybody in the computer market.

Edge Just like if you're a small record label and you've got a good product, you can potentially sell to the entire world? And the artist only has to do it once, and it's copied onto tape, CD and vinyl.

Jon That's exactly it.

Edge What do you think is the future of videogaming?

Jon The technology must advance. At the moment graphics are taking longer to do, but as soon as the technology's there to take the skeleton as soon as it's defined and literally let you do anything with it, the graphics development time will come hurtling down again, because suddenly from that one guy you've got a million frames. It's going to get to that stage. Then you've got a manipulatable character which you can make a cartoon out of. I think that's what games are going to become: interactive cartoons.

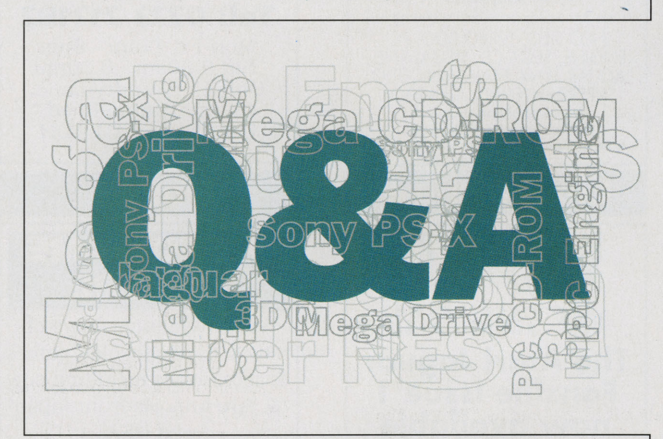
Edge What do you think you'll be doing in five years' time?

Jon Retiring, hopefully.

To get in Edge Directory talk to Jane Geddes on 0225 442244

questiontime

Send your **questions** to Q&A, **Edge**, 30 Monmouth Street, Bath, Avon BA1 2BW



However confusing the videogames world gets, **Edge** is always here to make sense of it all

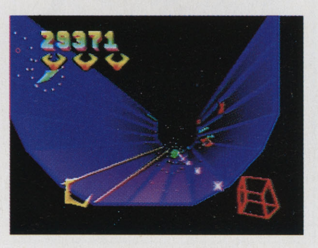
Q I have a few questions about the new consoles.
1. Is the 3DO worth getting considering the high price and number of games available?
2. If yes, should I buy an American version with a PAL booster from an importer, or wait for the UK version?
3. What is the difference between the Panasonic 3DO and the forthcoming Sanyo and AT&T models?
4. Judging from the prototype specs, which machine looks more powerful, Saturn or PS-X?

Kristian Guyte, Berks

A 1. 3DO's software position is improving all the time, but the machine still lacks enough decent titles to justify its purchase.
2. The US (NTSC) version of the machine will only run on a UK (non-multisync) PAL TV with the aid of a box that converts the NTSC S-Video signal to PAL. **Edge** has been informed that UK versions of the system will not display UK titles in letterbox format, so it might be worth waiting for the PAL version.
3. Sanyo's model should be virtually identical, apart from the shape, while AT&T are planning to release two models: one basic system and another with modem and voice capabilities.
4. The PS-X is, by all accounts, more powerful than Saturn, but Sega have responded by upgrading their machine's spec. Many believe Sony's hardware simply can't be matched.

Q 1. Do you think Atari will get their act together and sell enough Jaguars so developers will create some legendary titles for the format?
2. I have heard rumours that there will be a keyboard for the Jaguar, which suggests there might be some word-processing packages for it. If this is correct, will there be a printer?
3. Will the 3DO or CD32 have a keyboard and other extras?
4. What is **Edge**'s opinion of the CD32? Will it ever get original titles developed for it?

W Dew, Lancashire

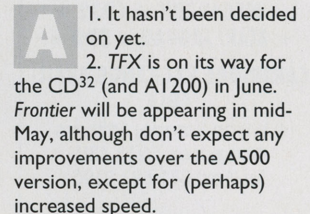


How does the Jag save games? (See letter from Tony Jones)

A 1. It's anybody's guess at this stage, but *Tempest 2000* is as legendary as they come.
2. Why on Earth would anyone want a printer for a Jaguar? Atari have mentioned a keyboard, but the system needs to establish itself as a viable console first.
3. Possibly, but see 2.
4. The CD32 is a good (albeit underpowered) machine, but the software is mostly tweaked A500 stuff. Where are the *Sonic CDs*, *Silpheeds* and *Thunderhawks* that the Mega CD can now boast? (See **Edge** 8 for a more in-depth appraisal of the CD32.)

Q 1. How much will the FZ-1 cost when it hits the UK?
2. Will games such as *TFX* and *Frontier* be available for the CD32? Will *Frontier* have texture mapping like the PC version?
3. Any news on Atari's 'crapper' CD Drive for the Jag?
4. What happened to the release schedule which used to be a regular feature in **Edge**? Are publishing houses simply too unreliable to waste paper on?

Neil Hirst, W Yorkshire



A 1. It hasn't been decided on yet.
2. *TFX* is on its way for the CD32 (and A1200) in June. *Frontier* will be appearing in mid-May, although don't expect any improvements over the A500 version, except for (perhaps) increased speed.
3. There should have been some announcements at the ECTS – see the news pages this issue.
4. You got it in one.

Q 1. Which provides superior picture quality, S-Video or RGB?
2. What is the likelihood of *Cannon Fodder* being converted for the Jaguar?

Lester Britton

A 1. RGB is a pure, unconverted signal and should usually give better results than S-Video, which is the next best thing.
2. *Cannon Fodder* is coming to the Jaguar and will be converted by The Dome – a bunch of Amiga programmers responsible for *Bob's Bad Day* and *Puggsy*.

Q 1. I have heard rumours that Atari Jaguar games will not have battery back-up and are prone to static which wipes the saved games off. Is this true?
2. I read in **Edge** that Atari have no Japanese software houses programming any games. What about all the Capcom and Konami classics like *Contra Spirits*, *Ghouls & Ghosts* and *Castlevania*? Will we never see games like these on the Jaguar?
3. Is *TFX* being released for the Jaguar?
4. What frame rate does *Checkered Flag 2* run at? This wasn't stated in your preview.

Tony Jones, Croydon

A 1. Jaguar carts currently use an electrically eraseable ROM chip for storing saved data – Atari call it the E^{2}ROM. It's a cheap alternative to battery back-up but a limited capacity means that its main use is for saving high-score tables. Atari claim that the technology is very reliable, but it's best to keep cartridges away from electromagnetic sources.
2. Atari are approaching companies like Capcom, but the



Is Edge guilty of ignoring Amiga owners? And what does Edge think of the CD32? (See letters from James Andrews and W Dew)

Japanese are rarely keen to work for platforms sold outside their home country.
3. There are no plans at the moment.
4. The game we saw back in **Edge** 4 has been recoded to use the GPU. The programmers reckon that the frame rate is now significantly higher – **Edge**'s guess is about 15-20fps.

Q 1. Having followed **Edge** since issue one, I've noticed that you rarely mention Amigas apart from in the letters pages, and you never review Amiga games. Why have you disowned Amiga owners?
2. Why haven't you talked about Commodore's 64bit AAA chipset? You have spent so much time drooling over all the new consoles that you have missed a far superior dream machine.
3. In **Edge** 7 you claimed that the CD^{32} can only display 256 colours. It can actually display 262,144, using its HAM-8 mode. It may not be much use in games, but for intro animations and still shots the quality is almost as good as 24bit.

I think a certain Trip Hawkins and a few other big yarn spinners should be looking out for Commodore.

James Andrews, Scotland

A 1. When companies start to invest in AGA software rather than porting A500 games over, we'll be keen to cover the Amiga. And exceptional software like *Cannon Fodder* will still find a place in **Edge**. However, next to the Jaguar, 3DO, and all the other stuff coming down the line, Commodore's 32bit hardware hasn't proved itself. Again, see the CD^{32} feature in **Edge** 8 for a programmer's perspective.
2. The AAA chipset might appear before the end of the year, but will probably be incorporated into a high-end Amiga first, accompanied by a high-end price tag. From a pure games perspective, how can the Amiga possibly compare to, say, the Saturn or PS-X, both of which claim hundreds of times the power of an A500, a low consumer price, and dedicated software from the best arcade game designers (Sega, Namco, Capcom, Konami)?
3. The machine doesn't have the power to make decent use of 18bit colour in games, but yes, we'll concede it can display it.

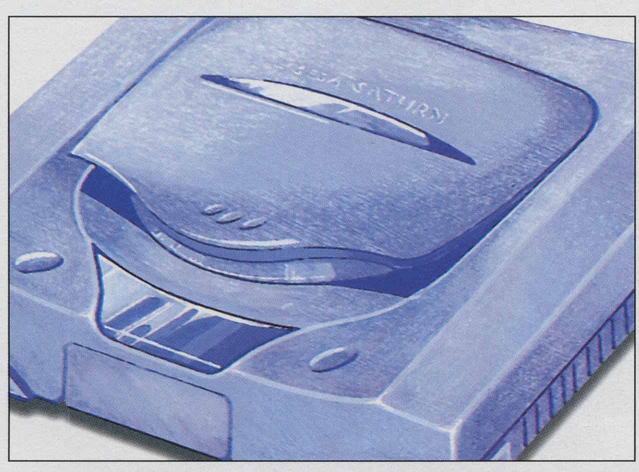


Are US Turbo Duo owners getting left out in the cold by TTi? Will the American Duo run the new Arcade card? (see letter from Dara Gray)

Q I own a Turbo Duo and I was wondering if you could answer these five questions for me.
1. When will *Y's IV* get a US release?
2. Will the Arcade Card get a US release?
3. What is the difference between hardware sprites and normal sprites?
4. Finally, would a Turbo Duo linked up to an NTSC TV run faster than on a SCART TV?

Dara Gray, Surrey

A 1. It possibly won't. TTi, the US Turbo Grafx distributors, are slowly edging out of the marketplace.
2. No, but you can run the Arcade Card and games with the aid of an adaptor. (Tel: Console Concepts, 0782 712759.)
3. Hardware sprites are blocks of graphic data manipulated by a custom chip at high speed. Consoles rely on hardware sprites (and scrolling) to create smooth movement of characters and backgrounds. If graphics like these were created in software on low-powered machines like the SNES and Mega Drive, they would be much more jerky.
4. No, as long as the SCART TV can display a 60Hz signal, it will run at the same speed: 60Hz.



Everyone knows about the Saturn, but how does the Titan arcade board fit into Sega's plans? (See letter from Daniel Mechan)

Q 1. Will Sega's Titan be compatible with Saturn?
2. Will Saturn have a cartridge slot?

Daniel Mechan, Cheshire

A 1. Titan is apparently based on 2D technology included in Saturn. Arcade games running on the Titan board should be relatively easy to convert to the Saturn, as Titan was actually designed by Sega as an arcade testbed for Saturn software.
2. Sega are announcing further details on Saturn this month. Check out the news pages this issue to see if any concrete details have emerged.

Q 1. When, in your opinion, is the earliest date that Sega will release an official Saturn machine in the UK?
2. Where does Saturn stand on FMV? Will an additional adaptor be needed, similar to Commodore's CD^{32}?
3. If I eventually buy an imported US Saturn, will there be any loss in picture quality or in the machine's reliability?

PM, Middlesex

A 1. Probably Autumn of next year.
2. No details are available at this stage, but it's highly unlikely that MPEG will be built in as standard – it's simply too expensive.
3. No, not at all. Funnily enough, if you buy an imported Mega Drive or SNES the display will be substantially better than what you would get on UK PAL versions. Imported systems, which run at 60Hz, fill the screen display and (through RGB SCART) have a much clearer picture – the difference is quite noticeable. As long as Saturn can be wired to SCART (unlike imported 3DOs) the quality and reliability should be beyond criticism.

Q and A

You can rely on Edge to cut through the technobabble and give you straight answers. Write to: Q&A, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW, You can fax us on 0225 338236, or e-mail us via future@cix.compulink.co.uk. with a subject line 'ATTN: Steve Jarratt'. Sorry, but we cannot answer any questions personally, either over the phone or by post.

Next month



Next issue Edge examines the cult of the Neo-Geo – SNK's hugely powerful home arcade system. With a full list of titles, a showcase of the best games, complete tech specs and SNK's plans for the future, this is destined to be the definitive guide to the 'Pro-Gear Spec Advanced Entertainment System'

EDGE 10

Thursday 26 May

continued Edge 10





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